

THE AUTOMOBILE



SAVANNAH, GA.,
March 21.—"No. 2
has passed Sandfly!" sing
the announcers.

"No. 2 is at the Isle of
Hope!" is the pronunciation
that follows. Then, an interval, and, next, from the bellowing
though musically pitched megaphoners, hurriedly told, is the news that
"No. 2 is turning at Thunderbolt!"

Far up the oil-streaked road there is a blur of red, coming towards
thousands of excited onlookers who know that the first winning of the
Savannah Challenge trophy is to be by a foreign-built automobile, yet
manned by an American crew. 'Tis a pretty sight, in the gorgeous sunlight
of late afternoon, this marvelously space-devouring perfection of moving
mechanism, and the beauty and chivalry of the New South, fascinated, enjoy
the greatest competitive spectacle of this wondrous age to the fullest extent.

Of course, there are hurrahs from the men, parasol and handkerchief
waving from the women, and vociferous strains from the band. Little Strang
is a modest and smut-faced hero, not even deigning to wave as he flashes
past the cheering multitude in the car from Italy. We Americans are not
adepts in acknowledging the salutations of those who would acclaim our
deeds. We accept it all in a matter-of-fact way.

But Savannah, the city, has made good its boast that it could supply an
ideal automobile course, and, furthermore, guard it. All this occurred on
Thursday, March 19, two days after St. Patrick's Day had been properly
celebrated by its many citizens whose ancestry traces to the Emerald Isle.

Yes, Savannah has made good. That is the finding of the automobilists
who to-day are returning northward. Priority and proximity to the metropolis of the country give to Long
Island first claim on the classic Derby of automobiling, the Vanderbilt Cup race. If conditions—some-
what chaotic at present—make Nassau County, New York State, unavailable, then Chatham County,
Georgia, has the inside track over all bidders, and has it because the Savannah Automobile Club, the city,
and the county demonstrated to the officials of the American Automobile Association entire ability to cope with
every phase of the complicated and exacting situation.

And it was a grand race that the Isotta Fraschini won, persistently pursued by an Apperson, which in turn
had a battle with the Acme, a new candidate for speed and endurance, while in fourth place was the Lozier, at



Governor Smith Eulogizes Strang and Marquese.

one stage a leader, and losing the place through circumstances undeniably exasperating, though all in a day's hard running. Fifth finished the Isotta, originally picked as the favorite of the event. Two others—an American and a Stearns—were still going when Referee Webb concluded the 342-mile struggle. An eighth starter had met with disaster, but this Apperson and its crew suffered little beyond a jolt and a scare.

This contention for the Savannah Challenge trophy took place Thursday, in the presence of some thirty thousand people, a third of whom were located on, or in the vicinity of, the capacious grandstand, in the royal box of which sat Hoke Smith, Esq., Governor of the Commonwealth, and the first Chief Executive of a State to recognize the great worth of the automobile by sanctioning the use of military to guard the course for a motor-driven vehicle contest. Mayor Tiedeman, early wideawake to the opportunity of exploiting Savannah, saw to it that the portion of the course lying in the city limits had efficient police protection. Therefore, the great problem of the past in the conduct of automobile races in this country was answered most satisfactorily.

Wednesday had served to some extent as a dress rehearsal for the big race. An Apperson, piloted skilfully by the experienced Lytle, appropriated the Southern runabout cup, its only finishing rival being a Thomas Detroit "Bluebird," J. B. Lorimer, driver; the speedy Pennsylvania, with Zengle at the wheel, having suffered a mishap which took it out of the sputtering argument after the fastest round of the 17.1-mile course.

The six-cylinder duel between the Thomas and the Stearns promised much. But it was the fate of the latter to suffer dismemberment after a couple of laps, thus leaving the other to score unopposed, which it did regularly and faultlessly.



Some of the Hard-working Official Notables.

Starting on the right: Chairmen Thompson and Van Sicklen, Referee Webb; Director Haynes, Secretary Elliott, First Vice-President Speare, Harry Dunn, Starter Wagner, Assistants Reeves and Rutz.

Savannah's leading citizens were responsible for the success accomplished. President Frank C. Battey, of the Savannah Automobile Club, had no more enthusiastic fellow-worker than Mayor George F. Tiedeman. These two were on the job from early until late, though the honor list contained other indefatigables, including Capt. R. J. Davant, chairman City Council; Major W. W. Williamson, president Chamber of Commerce; Wright Hunter, president Cotton Exchange; W. B. Stillwell, president Board of Trade; A. B. Moore, vice-chairman County Commissioners; J. J. Rauers, Harvey Granger, George J. Baldwin, Robert M. Hull and Secretary A. W. Solomon. A loud and unqualified word should be said for Major W. B. Stephens, who handled the military arrangements unobtrusively flawless.

It was a joint committee of the American Automobile Association's racing and technical boards which stood behind the Southrons and contributed help in various ways. Chairman Jefferson deMont Thompson, of the Racing board, figured as an honorary referee, along with Governor Smith and Mayor Tiedeman. Chairman Van Sicklen, of the Technical board, came to Savannah over a fortnight before the races, and lent aid day in and day out. Vice-Chairman Frank G. Webb, of the Racing board, was the conscientious referee, and Vice-Chairman David Beecroft, of the Technical board, examined the cars to see that stock chassis requirements were observed. Secretary F. H. Elliott, to whom much credit is individually due for the Savannah undertaking; L. R. Speare, first vice-president, and Directors S. L. Haynes, Charles J. Swain and A. G. Batchelder were of the party which came to the races in a special car on the Seaboard Air-Line. H. M. Swetland, A. B. Tucker, L. Eikwort, Jr., and M. C. Reeves were other officers of the meet on the same train. Starter F. J. Wagner and his assistant, W. A. Rutz, came up from Florida. Announcer C. T. Earl was another "regular" who reported, as usual.

When one considers that though Savannah has a population of about 85,000, some 40,000 are colored, one cannot but marvel at the progressiveness of this picturesque place, which contains much to interest the visitor from the North. Peach trees, suffused with pinkish color and redolent of spring; pear trees, clad in white blossoms and diffusing fragrance, with the yellow jasmine adding to Nature's perfume, prodigious live oaks drooping with Spanish moss; palmettos contributing still more to the tropical effect, all blended into a picture inviting to the stranger. Negroes, shiftless but amusing, completed the atmosphere of the Southland, while Old Sol lent rays which at times became somewhat uncomfortable and supplied burnt faces and peeled noses. But apparently the Northerners hugely enjoyed the visit.

In the preparation of the course nothing was allowed to interfere with making it as safe and secure as possible. Cuts were made across lawns, curves were banked, bridges improved, even built over the road, electric railroads partially suspended operation, and, in fact, everything was made subservient to automobile's needs. True it is that the hotel accommodations did not come up to the Broadway standard, but two men who were at the Grand Prix of 1906, and sweltered in box-like rooms at Le Mans at \$10 per night, were rather inclined to believe that Savannah did fairly well under the congested circumstances. And even Vanderbilt Cup experiences on Long Island called forth recollections of sleeping on billiard tables or on cots in parlors, temporarily converted into bedrooms—and prices of the get-rich-quick complexion. But Savannah realizes that if it is to become more of a winter resort than it has been in the past, it must provide better than it now has. Something is assured in the near future.

One thing is a certainty, and that is that the members of the Vanderbilt Cup Commission feel decidedly happier than they did a year ago, knowing that if Long Island cannot be the scene of the race, there does exist a city called Savannah, in a county called Chatham, containing therein a course which will be well guarded, well prepared, and most satisfactory for the great automobile race of the year. Governor Smith is progressive, and Adjutant-General Anderson shares opinions that harmonize.



The Story of the Big Race

By John C. Wetmore

Strang and His Italian Winner in Full Cry on the Most Picturesque Stretch of the Entire Course.

S AVANNAH, GA., March 19.—In recognition of the magnitude of the event and its importance to Georgia's great seaport, and by way of demonstrating how rich runs the true sporting blood in the veins of our Southern gentlemen, Governor Hoke Smith had proclaimed a legal holiday in the city. Savannah stood ready to honor the occasion to a man and Savannah's far-famed fair women to grace the occasion by their presence. The State at large also took an eager interest in the event, and excursion trains from all points poured thousands into town.

The early morning hours gave poor promise of a sunny day. There were threatening clouds and chilly winds, which compelled those whose official business compelled an 8 o'clock start for the course to don heavy clothes and prudently provide themselves with overcoats and mackintoshes.

Crowd Was Admirably Controlled by the Militia.

Long before this, however, the militiamen, flagmen and telephone operators in trolleys and automobiles were under way for their stations, and seekers for points of vantage had hurried them in their vehicles, for the course was to be absolutely closed at half past eight o'clock. By 9 o'clock a normal March sun had chased away the clouds and brought joy to the hearts of womankind at the chance to discard wraps for the gay Spring garb that had for weeks been in course of preparation for the great occasion. A half hour later the octette of racing candidates was on hand and drawn up in the order of their start. Far down the long stretch one could see a line of people extending out of sight, all fully 100 feet away from the road, and around the first turn, a quarter of a mile to the east, hundreds massed. At the Isle of Hope and in Thunderbolt, the two settlements on the route, there was a congestion of spectators. Here the efficient militiamen were massed five or ten feet apart. Other soldiers stretched in a thinner line along the open country segments of the circuit. No word of praise can be too high to characterize their discipline and efficiency. The crowd knew they meant business and obeyed. One man sought to cross the track when forbidden and got a bullet in his heel as a souvenir of the military authority that prevailed and that Major Stephen's soldiers intended them to obey orders. When a car stopped for an adjustment or repair, the soldiers kept back the crowd. Even when the Apperson overturned, only enough men to right the car were permitted to approach it.

Sixty flagmen encircled the course, showing the racers "yellow" for danger and "red" for a clear course. They had been re-

hearsed for a week during the daily practice hours. Fifteen telephone stations had been established and manned. "It was a cinch to drive down that aisle of safety," said one of the pilots. "All you had to do was to open her up and let her go."

The grandstand was gay with the A.A.A. banners above and the national colors and flags stretched beneath the boxes. It was set at an angle so every one had an uninterrupted view of the racers rushing down the homestretch. In the vast open field opposite, there were only the press and official stands and three great bulletin boards, on which were painted the scores of the cars by laps, to obstruct the view across the open to the White Bluff road, down which for a mile the racers could be seen in the stirring speed flights and exciting struggles to pass one another. Within that great field were but the megaphone men and the bulletin chalkers.

Savannah's fashionable folk are not early risers, so when 10 o'clock, the hour of the start drew near, the great stand, with its 5,000 seats and 65 boxes, was but half filled, and there were many vacancies in the 50 parking spaces adjoining and extending up the stretch. In fact, it was not until the American, the third car, was sent away, that Governor Hoke Smith and various State and judicial dignitaries drove up in carriages with bared heads in response to the greeting of the standing crowd. Within an hour, though, the stand and parking spaces were filled.

STORY OF THE RACE BY LAPS.

The Start.—Sharp at 10 o'clock Fred J. Wagner, the A. A. A. official starter, began the sending away of the cars at minute and a half intervals in the following order:

No. 1. APPERSON JACKRABBIT.....	Herbert Lytle.
No. 2. ISOTTA-FRASCHINI.....	Louis Strang.
No. 3. AMERICAN.....	F. J. Tone.
No. 4. LOZIER.....	H. Michener.
No. 5. APPERSON JACKRABBIT.....	Wm. McCulla.
No. 6. ISOTTA-FRASCHINI.....	Al Poole.
No. 7. STEARNS.....	Frank W. Leland.
No. 8. ACME.....	M. Neustetter.

Before the start it was announced that the official measurement of the circuit was 17.1 miles, making a 342-mile run of it for the 20 laps. The contending cars were limited to a maximum piston displacement of 575 cubic inches.

When the last car had been sent away and vanished from sight down the White Bluff road there was a craning of necks for the first racer to reach the homestretch. It was Lytle. He flashed by in 18:35. Forty-five seconds later came John H. Tyson's



Lining-up for Start of the Savannah Challenge Trophy Race on Thursday Morning; Weather Perfect, Highway Likewise.

red Isotta with Christie's old mechanic rushing the pace so fast that it had picked up 45 seconds on the flying Jackrabbit by a lap in 17:50, the fastest of the round. The others were content with a more moderate pace, running from 18:41 for Michener to 19:56 for Neustetter. Tire troubles which afflicted Tone sorely throughout the race began early for the American, reducing the time to 27:51. Leland had been forced to stop and brought up the rear of the procession in 30:03.

Second Lap, 34:2 Miles.—Strang was evidently out for a hammer and tongs fight for the lead from the start. Running the round in 17:41, he made up his minute and a half handicap and passed Lytle into the head of the procession and a real lead in the race of nearly two minutes over his nearest pursuer. Leland passed the luckless Tone.

Third Lap, 51:3 Miles.—In the third round word was received that McCulla's Jackrabbit had overturned. It had upset in rounding one of the sharp Isle of Hope turns too recklessly. McCulla was pinned beneath the car. There was a rush of ready helpers, who quickly righted the machine and released its pilot, who escaped with a sprained and bruised back. The car was too badly damaged to continue in the race and was soon declared officially out.

Strang had retained his two-minute lead over his nearest pursuer, but Michener had got by Lytle and so had Poole, so far as the order of the procession went. Neustetter had moved up into fifth place and Tone gotten by Leland. As a matter of fact, the Stearns had thrown a tire and torn through a barbed wire fence. Both he and his mechanic, Nick Brewer, were cut up a bit by the barbs, but pluckily continued after plugging the damaged radiator.

Fourth Lap, 68:4 Miles.—In this round of sprinting Strang increased his lead by half a minute, while Michener hung grimly to his two-minute margin over the other Isotta. The Acme, which was running on a 19-minute schedule under instructions, had crept up into fourth place through Lytle having to stop to mend with tape a broken oil feed leading into the crankcase. Tone was having more trouble with his tires and had been passed by Leland.

Fifth Lap, 85:5 Miles.—Strang pulled away a bit further

from Michener, who hung stubbornly to his two-minute lead over Poole.

Sixth Lap, 102:6 Miles.—The Acme stopped as per schedule to replenish fuel and enabled Lytle to make five minutes of his lost ground.

Seventh Lap, 119:7 Miles.—Poole was forced to stop and change tires and put in new plugs, the porcelain having broken. This gave Michener a lead of seven minutes and allowed the steady plodding Neustetter to creep up within two minutes of him. Lytle had to change spark plugs and lost what he made up on the Acme. Strang was now leading by fully four miles.

Eighth Lap, 136:8 Miles.—The end of this round saw the Lozier, which had been speeding speedily and consistently, in the lead, the only American car to poke its radiator ahead of the Italian. It was but 14 seconds to the good, however, so the struggle was a neck and neck one between the American and Italian cars. When the score was announced there was great excitement over the duel in progress for the lead, the pair being nearly seven minutes ahead of the other Isotta.

Ninth Lap, 153:9 Miles.—Strang started in with vigor to overtake the flying Lozier, which had snatched the lead from him through the Isotta having to stop for a change of tires, to such good purpose that he overtook and passed Michener, leading him by a minute and a half at the end of the lap. Poole, by a circuit in 17:39, had gained considerably on the two leaders. Later it developed that the Lozier had run short on oil and its pistons had seized.

Tenth Lap, 171 Miles.—With the race half over, it looked almost like a runaway for Strang, for he led Poole and Michener respectively by eight and ten minutes. Tyson's Isotta had averaged 54 1-2 miles an hour. Lytle and Neustetter looked hopelessly far behind, and Leland and Tone, though pluckily persevering, were not to be considered in the chances. The Lozier now had its muchly needed oil. At the halfway point seven of the eight starters were running. The best race yet.

Eleventh Lap, 181:1 Miles.—With this lap the fine showing of the Lozier came to an end and its chances of figuring prominently at the finish began to vanish, for its lubrication

troubles put it eight minutes behind Poole's car. Neustetter had increased his lead over Lytle to ten minutes. In fact, it was a bad round for all of the racers but Strang.

Twelfth Lap, 205:2 Miles.—Strang now had the race well in hand, and with his lead of 18 minutes it looked all over but the shouting. A good fight for second place was once more on, the Lozier having bucked up a bit and cut down Poole's lead to two minutes. The six-cylinder Acme was plugging along in fourth place.

Thirteenth Lap, 222:3 Miles.—Poole got the Isotta running again in fine shape and made a desperate effort to cut down his mate's lead by a lap in 17:31. This brought him within four minutes of Strang and 12 minutes ahead of Michener. Once more it looked like one, two for the imported pair, with the Americans far to the bad.

Fourteenth Lap, 239:4 Miles.—Now began Herb Lytle's memorable run to regain lost ground and again place the Apperson among the leaders. From this point to the end of the race the Apperson midget ran every lap but one under 19 minutes. His troubles were over, his tanks refilled, and his tires changed for the final fight for a good place in the race. Neustetter, though, still hung stubbornly to that five minutes lead of his.

Fifteenth Lap, 256:6 Miles.—Lytle covered the next lap in 18:42 and crept up to within three minutes of the Acme. Strang still held to his 13-minute margin over Poole, and Lozier was dropping further back to Acme.

Sixteenth Lap, 273:6 Miles.—The relative positions of the gladiators remained practically unchanged in this round, except that the Lozier crept up a bit nearer to Poole. Neither Leland nor Tone was scored for this round. Leland had run two laps on a bare rim.

Seventeenth Lap, 290:7 Miles.—Calamity overtook Poole in this round and cost him his place among the leaders. There was a stoppage in his gas lead which compelled him to remove his carbureter. It took him 42:40 for the lap, and at the end he had dropped from second to fifth place. Lozier was again in second place, but was 24 1-2 minutes behind the leader. Lytle's

plucky driving had brought him to within a minute of Neustetter, or, to be exact, 46 seconds. Strang was making a runaway of the contest, with a lead of 24 minutes.

Eighteenth Lap, 307:8 Miles.—Now began the struggle between the trio of battlers for place honors which most of all made a great race of the contest and will long live in motor road racing annals. Lytle had passed Neustetter and had crept up so close to Michener that the Lozier pilot only held his runner-up place by a little over a minute margin, with Neustetter less than a minute behind the Jackrabbit steersman. The closeness of the scrap is evidenced by the score: Michener, 366:37; Lytle, 367:42; Neustetter, 368:10. When the complete figures appeared on the bulletin boards the spectators woke up to the situation, and from that point on eagerly strained their eyes up the stretch for the coming of the cars and wildly cheered each one as it shot by.

Nineteenth Lap, 324:9 Miles.—Lytle was the first to be sighted. He had opened the gap separating him from his pursuers to exactly four minutes. Neustetter was now his pursuer, having passed Michener into a lead of over three minutes. Poole in this round made one last despairing run, and in so doing scored the fastest lap of the race for the Isotta, 16:46. He was hopelessly out of it, however, for one-two-three honors.

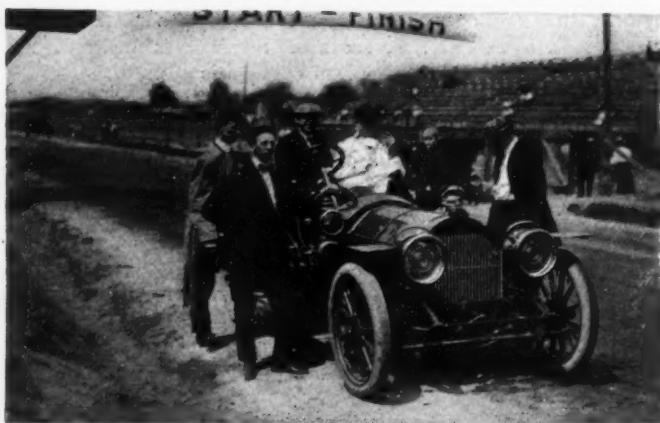
Twentieth Lap, 342 Miles.—Only an accident could have deprived Strang of the race. In fact, he had completed the nineteenth round before his pursuers had reached the eighteenth post. He had an ovation as he crossed the tape, a winner in 381 min. 30 sec., or 6 hrs. 21 min. 30 sec.

Great Enthusiasm Marked the Finish.

Interest in the race was now in the struggle for second place. Lytle met with a wildly enthusiastic reception as he flashed by in 404 min. 37 sec. Hardly less enthusiastic was the greeting accorded Neustetter, who was third in 409:05, and Michener, who finished fourth, in 409:17. Poole captured fifth place in 418 minutes flat. Tone and Lozier were last scored at the close of the 15 laps, or 256.5 miles, the American in 366:30 and the Stearns in 405:24. The Savannahians were heart-



Immediately After Making This Isle of Hope Turn, Pursuing Isotta No. 6, McCulla's Apperson Turned Over.



Appersonians Were Successfully in Evidence.



Owner Kiser, Driver Salzman, Six-cylinder Thomas.



Harry Lozler Was an Interested Observer.



Governor Smith Utilizes a White Steamer.

broken over the bad luck of their sole representative, which Ross Guerard had entered.

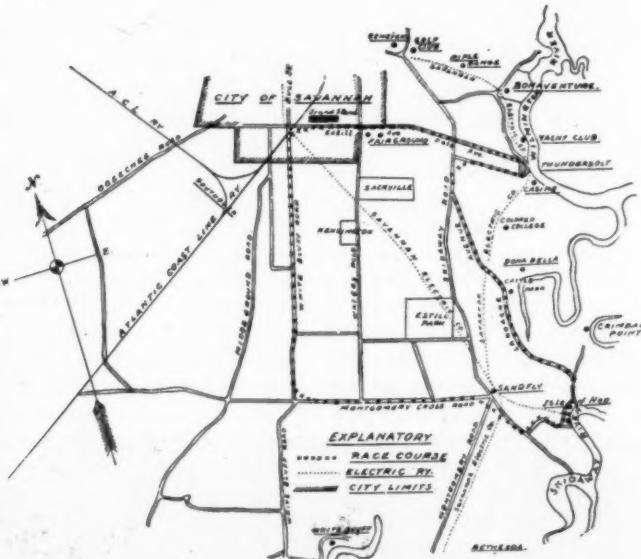
It had been the grandest and closest struggle in the history of long-distance automobile racing in this country. Seven out of eight starters were fighting the fight when the race closed, a record of survivorship never even approached in any previous motor road race on either continent.

The winning Isotta, which was equipped with Michelin tires, did not even have to make a replacement during the race and kept its motor running without a stop from start to finish. Its only mishap was the breaking of the starting crank through the strap being too tight.

The Apperson's motor never once stopped running. An oil lead to the crankcase broke, necessitating wrapping with tape.

The Acme ran on a 19-minute schedule. It was stopped on the sixth and ninth laps for fuel and in the eighth for new tires. It was the only six-cylinder car in the race.

The Lozier's troubles had mainly to do with tires, but difficulty was also had with the exhaust, which broke and dragged until camp was reached. It was too hot to be removed by hand. It also had another vital trouble. The car was the same one used in 24-hour races last year and was fitted with two five-gallon oil tanks. Since the stock car only has one tank, the



Map of the Race Course at Savannah.

technical officials ruled that it could start with 2 1/2 gallons in each tank. It was figured that the car would go half the distance with this amount, but the estimate fell short, the supply ran out miles away from the camp, the pistons seized, and the engine received a bad wrench.

At the conclusion of the race the victorious Louis Strang and his mechanic, John Marquese, were brought before the stand and introduced to Governor Smith, who, in an eloquent speech, presented them to the Savannahians.

ST. LOUIS INTENDS TO BID FOR VANDERBILT.

St. Louis, Mo., March 23.—Despite all the advertising Savannah got because of its tremendous success in running off the three stock car races last week, St. Louis, through the St. Louis Automobile Manufacturers' and Dealers' Association and the Automobile Club of St. Louis, is determined to make a strong bid for the next Vanderbilt Cup race. Scouting expeditions have been out of late looking for a suitable course, and think they have a good one in sight. It is approximately 32 miles in length, starting on the Clayton road at the North and South road, and running to Henry avenue, through the village of Manchester, thence back over Manchester road to the North and South road, and then to the starting point.

Some Mechanical Facts of the Racers



By David Beecroft

First Off on the First Day Was Apperson No. 1, with Lytle at the Wheel.

SAVANNAH, GA., March 21.—Of the thirteen cars that participated in the different events of the Savannah carnival, not one but conformed in all details with stock construction. All of them were not the chassis of touring cars—far from it. Rather, the autoist of to-day is accustomed to seeing almost any kind of chassis and body lines for a roadster car. A few critics in the grand stand suggested that "such and such" was not a stock model, but that was disproved when the interpretation of the rules, which called for the manufacture of five similar cars of that type previous to February 1, 1908, was considered. In the 342-mile event for cars with a piston displacement less than 575 cubic inches, the two Isotta-Fraschinis looked very much like special racing cars with their big gasoline and oil tanks and racy lines, but it was demonstrated to the satisfaction of all that these cars had been manufactured in considerable numbers during the past year, and, like the Renault and one or two other foreign concerns that build racing runabouts, are in reality stock models, as much as the less racy roadster cars turned out by some of the American makers.

It is questionable if the stock phase of the two Apperson Jackrabbits in this same race would not have been questioned if the race enthusiasts had not been aware of the fact that they had been regularly on the market for more than a year. Some question was raised as to the Lozier's eligibility, but Mr. Mead, the company's representative, certified that seven of these cars have been built. In case of the three remaining cars in this event, namely, the American roadster, the six-cylinder Acme, and the four-cylinder Stearns, no question as to their right to contest was raised, their lines being that of standard touring car or roadster.

Characteristics of the Most Successful Competitors.

The winning Isotta reached Savannah two days before its race, having been rushed out of customs at New York to take the place of Harding's Isotta that was wrecked. Up to the time it reached Savannah its motor had not been turned over since leaving Italy, and Strang had not driven this make of car before that time. The car in the race showed, however, the careful working out it must have received before leaving the factory. The Isotta is a high-speed engine, of the four-cylinder type, having cylinders cast in pairs with opposite valves. When traveling on the course its motor turns over at 1,800 revolutions per minute, which speed is made possible by the use of exceedingly large flat-seated valves measuring 3 1-2 inches in diameter. Also assisting in this high-speed work are the extremely light pistons, rendered so by perforating them beneath the rings and using a hollow connecting rod. The cylinders have a bore of 145 mm. and a stroke of 120, equivalent to 5 4-5 and 4 1-2 inches, respectively. Instead of using the double ignition outfit employed on all of the other racers, but a single high-tension Eisemann magneto outfit with one set of plugs, is used, the plugs being carried horizontally in the intake valve chambers. In the clutch are 51 discs—25 steel and 26 bronze. These cars on the course consumed a little more oil than the others, requiring all told 24 gallons each for the twenty laps, or close to a gallon and a half a lap. The car is supplied with two sets of brakes, cast-iron shoes, operating against steel drums. The regular brakes on the

jackshaft are 9-inch drums with 3-inch bands, whereas the rear wheel emergency brakes are 11 1-2-inch drums with 2-inch friction shoes. The car has a particularly large exhaust pipe, with a cut-out opposite the center of the chassis. It was shod with Michelin.

Lytle's Apperson which finished second, differs radically from the Isotta's in that it uses separately-cast cylinders with opposite valves, and has a bore of 5 1-2 inches and a stroke of 5 inches. While the Apperson cars do not use such large valves as the Isotta, they have always been known to be among the largest made use of in this country and also to be of the flat-seated type. The ignition employed was a double system, Bosch magneto and battery, with two sets of plugs, that for the magneto over the intake valves and the battery set over the exhaust valves. These cars have a wheelbase of 105 1-2 inches, which is 1 foot shorter than that used on the Isotta's, and which assisted them not a little in making the turns. Diamond tires were used.

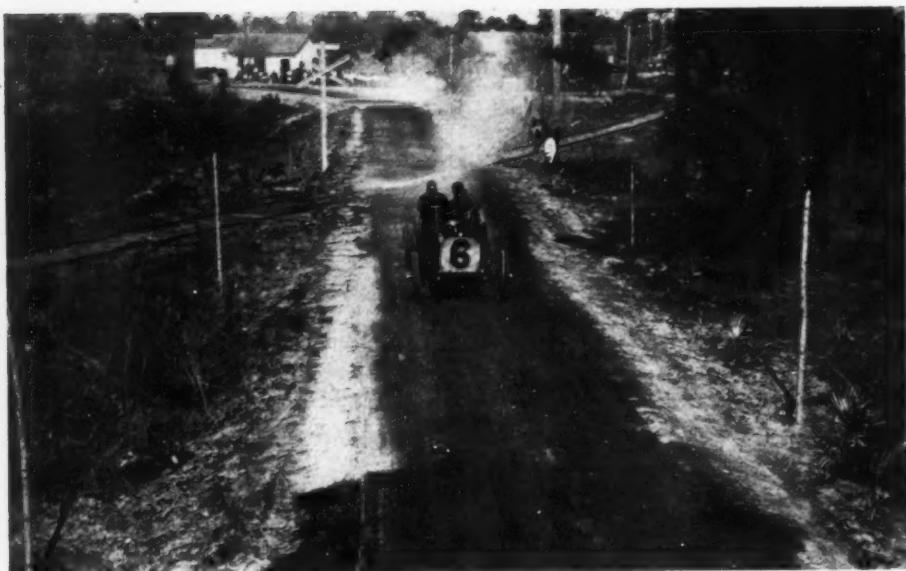
Showing of the Only Six-cylinder in Challenge Event.

By finishing third, the six-cylinder Acme established itself as a prime favorite, because of its consistent running, the majority of the spectators knowing that it was going according to a pre-arranged schedule. It had the distinction of being the only six-cylinder car in the race, and the regularity of its work was a satisfaction to many. Its motor has six separately cast cylinders, of 4 1-2-inch bore and 5-inch stroke, and intake and exhaust valves placed on opposite sides. Its ignition system combined Eisemann high-tension magneto and a storage battery outfit, with two sets of spark plugs, one set over the intake valves, the other over the exhaust. The lubrication system is confined to a 3-quart mechanical oiler on the dash, from which pass three leads to the crankcase compartments. Its gasoline capacity is 23 gallons.

The 60-horsepower Lozier is a 1907 car, and one that has been seen on the track in 24-hour races. Its external appearance is characterized by a very large cylindrical gasoline tank, carried transversely behind the seat, two 5-gallon cylinder-shaped oil tanks, carried from the frame at the sides, and its white finish. The car has four 5 1-2 by 6-inch cylinders, cast in pairs with opposite valves—typical Lozier construction. It uses a double system of ignition, in which are used Simms-Bosch magneto, and a Witherbee storage cell, with two sets of plugs over the valves. Its oiling system is quite complete, in that three leads connect with the crankshaft bearings and two with the crankcase. The right side oil tank carries a supply which is forced into the oiler by pressure, and the left-side tank is provided with a pump for injecting oil directly into the crankcase.

Facts About the Other Cars Participating.

Of the remaining two cars, the Stearns and the American, it might be added that the Stearns is a 1908 four-cylinder car, the same as described last week in THE AUTOMOBILE. The American car, while of the same design as the American roadster, familiarized to the public during the last year, has a larger motor, it being rated at 50-horsepower, and having four cylinders with 5 1-4-inch bore and 5 1-2 stroke. These cylinders are in pairs with valves on the right, and take double sets of spark plugs for the magneto and storage battery ignition system. The lubrication of the engine is cared for by a 6-pint oiler on the dash,



This Railroad Track Was Not Used During the Race.

with a 2-gallon auxiliary tank, carried on the chassis. From lubricator are leads to cylinders, engine bearings, and crankcase.

The Six-cylinder Candidates for the Southern Cup.

The two cars that contested in the six-cylinder Southern cup race on the first day were both 1908 six-cylinder machines—the Thomas carrying all the earmarks of the four-cylinder Thomas, and the Stearns having a similar relation to its four-cylinder brother. The winning Thomas has its six 5 1-2 by 5 1-2-inch cylinders cast separately and provided with opposite valves. Its ignition doublet is a Bosch magneto and Atwater-Kent unit, taking its supply from dry cells. The car uses the three-disc clutch common to Thomas machines and drew its gasoline from the standard tank beneath the driver's seat, although it carried a large barrel-shaped gasoline tank in the rear, which during the race was filled with water and aided the car considerably in holding the course. Diamond tires were used. The Stearns six was one of the first the company turned out, and while its cylinders are the same castings as used on fours, yet its motor design is of the 1907 Stearns and not the 1908, as was the case with the four-cylinder car. The other chassis lines were very similar to those employed in the four.



Lozier Passing Grandstand, Leading and Looking All Over a Winner.

Those Entered in Runabout Class.

The three cars which competed in the small runabout class, with piston displacement under 375 cubic inches, show widely different methods of construction. Lytle's winning Apperson has 4 3-4 by 5-inch cylinders which are separate castings with opposite valves, the same as employed in the regular Apperson lines. Used on it is a double ignition, with Bosch magneto and storage battery, delivering current respectively to plugs over the intake and exhaust valves. Employed also is the standard band clutch and the three-speed selective gearset. Like the other two competitors in this event, the Thomas-Detroit and the Pennsylvania, it is a shaft-driven machine.

The Thomas-Detroit, which finished second, uses 4 3-4 by 5 1-4-inch cylinders, which are cast in pairs and have both sets of valves on the right side. Employed on them is a Bosch magneto. The Pennsylvania, which met with an accident in

the second lap, is the only car in the three races to use a motor



Soldiers Were Useful and Not Ornamental.

with valves in the cylinder head, as well as transmission incorporated with the rear axle. The four motor cylinders are 4 3-4 and 5 1-4 bore and stroke respectively, which permitted it to get just within the 375 cubic inch limit.

Difficulties Met and Overcome.

In recounting the story of the race, it must be borne in mind that the two Isotta cars were reckoned as big factors in it. From what has transpired since the race, it is apparent that Strang went out "to beat" it right from the starting signal, whereas Poole took a safe pace for the first half, and then, perhaps, was ready to strike whatever pace the exigencies called for. Out of the twenty laps, Strang held first place in every one but the eighth, when the Lozier crowded him out by 14 seconds, which lead was to be lost in the ninth, when Strang was leading by 1 minute and 32 seconds. But his position was unsafe during the earlier part of the race.

Everybody had staked pretty liberally on the white Lozier to hold the Isottas,

and the work of it in the first eight laps showed how well such ground was taken. In every one of the first eight circuits, Michener did the work in 18 minutes and a few seconds—a phenomenal record for consistent running. But Lozier's chances ended with the ninth lap. The tenth and eleventh laps were bad, requiring 26:31 and 27:12 minutes, respectively, to go the course. It was apparently at this time that the exhaust pipe connecting with the muffler worked loose, and added to this was the work of refilling with gasoline and oil. For four laps Michener picked up his old pace, but dropped back in the seventeenth, eighteenth, and nineteenth. The last lap was made in 18:57, the car showing its earlier speed when free from the muffler and tire troubles. But while it dropped back into the fourth place, the Lozier was one of the interesting factors in the race. Even when the Lozier's chances against the Strang-Isotta combine were poor, it was an active factor in the

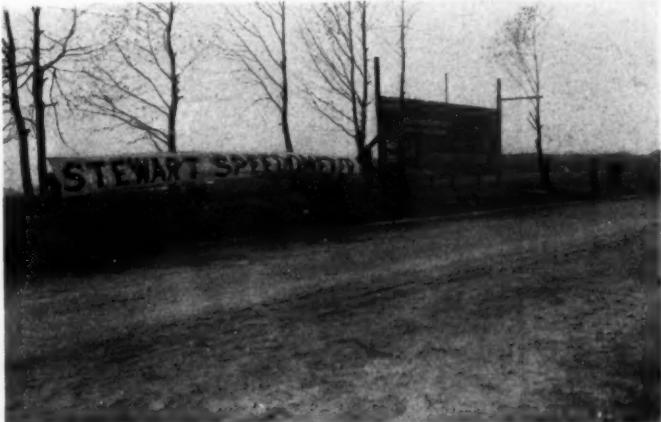


Tires Will Burst, but Nowadays Are Quickly Replaced If of the Demountable Kind.

Apperson-Poole-Acme

gasoline line, which brought the time of the lap up to 42:40, the longest of the day, except for a couple made by Leland when he went the circuit on three tires and had other troubles. This lap took the sights of victory out of Poole's firmament, for, while he worked on the roadside, Apperson, Lozier, and Acme had been flying past; Apperson and Acme climbing up into second and third places with each lap, while Lozier was losing a little, but making certain its position ahead of Poole.

The three-cornered fight between Lytle-Apperson, Michener-Lozier, and Neustetter-Acme was interesting, and a big feature in the second half of the race. It will always prove an interesting chapter in the history of road racing how stubbornly Lytle fought from that fifth position to second. During the "dark ages" of his race, laps four to sixteen, inclusive, he had his little troubles. A copper oil pipe to the crankcase broke and had to be taped; then the hand oil pump for injecting oil into the crankcase broke and matters looked dark; added to these discomforts was the small lubricator that the car carried on its dash, and which is fed from a rear oil tank by pressure. Mechanician Davis pumped oil all the time, and then the motor could not get enough. However, the "long lane" had a turning.



Only Photographers and Officials Allowed Inside.

game, and not until it crossed the finishing line did the spectators know the exact position it held in the field.

When the Lozier dropped from second to third place in the tenth lap, and Al Poole, with his Isotta, took second place to Strang in the other Isotta, the horizon looked a little gloomy for American machines. Everybody thought that the earlier prediction of "Poole letting loose in the second half" had come true. So it had, but not for long, for he, too, was doomed to disappointment. Spark plugs went back on him, the green porcelain cracked with the intense heat, and, added to this, was the trouble of the compression relief cocks in his cylinder heads working open. Once they opened in the homestretch, necessitating a stop at the east end of the grandstand. Laps seventeen and eighteen clouded all his hopes, and were the turning points of the race in the deciding of what cars would get second, third, and fourth places. Going down the backstretch, his carbureter went back on him. It was necessary to take off the carbureter and clean out the



One of the Banked Turns Especially Prepared by the County Road Commissioners.

TABULAR HISTORY OF THE 342-MILE RACE FOR THE SAVANNAH CHALLENGE TROPHY, TELLING TIME BY LAPS AND TOTAL TIME.

No.	Car	H.P.	Owner	Driver	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total Time	Fin- ished
2	Isotta	50	John H. Tyson	Strang	17.50	35.46	53.37	71.37	89.17	107.59	126.24	149.11	167.9	186.15	201.85	224.06	244.06	267.46	281.48	300.28	319.07	341.23	362.23	381.30	6 hrs. 21 min. 30 sec.	1
1	Apperson	50	Apperson Bros.	Lytle	17.56	17.41	18.10	17.40	18.42	18.25	22.47	18.02	18.02	18.12	18.08	22.31	18.40	19.02	18.40	18.39	22.19	20.57	19.97			
8	Acme	50	Acme M. C. Co.	Neustetter	19.56	39.14	58.44	78.23	98.05	119.42	139.01	163.34	182.51	204.58	224.21	247.46	267.46	287.46	307.24	329.03	348.10	368.10	387.43	407.05	6 hrs. 47 min. 5 sec.	3
4	Lozier	45	H. A. Lozier	Michener	18.41	37.08	55.40	74.12	92.52	111.28	130.14	148.57	168.45	195.16	222.28	241.97	260.46	288.55	301.46	320.21	343.38	366.27	380.20	409.17	6 hrs. 49 min. 17 sec.	4
6	Isotta	50	Isotta Imp. Co.	Poole	18.53	37.46	57.36	76.11	95.00	113.17	137.16	156.22	173.01	193.21	212.57	230.29	248.00	264.41	294.15	313.46	356.26	384.34	401.20	418.53	5	
7	Stearns	30	Ross Guerard	Leland	18.53	39.50	59.18	78.35	18.49	18.17	23.58	18.07	17.39	20.30	19.36	17.32	17.31	26.41	19.34	19.31	42.40	28.08	16.46	17.33		
3	American	50	Amer. M. C. Co.	Tone	19.51	32.51	52.25	72.22	119.43	138.00	191.27	238.34	260.57	288.07	310.27	337.29	359.51	382.23	405.24	Still running when race was called.						
5	Apperson	50	Apperson Bros.	McCalla	19.52	39.08	59.08	79.08	Car upset and was withdrawn.	19:16	1:08	19:26	41:11	29:13	19:13	22:33	20:53	25:12	34:14	21:42	21:20	21:25				

HOW THE POSITIONS CHANGED DURING THE PROGRESS OF THE SAVANNAH CHALLENGE RACE.

No.	Car	H.P.	Driver	Mechanic	1st	2d	3d	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	16th	17th	18th	19th	20th	
2	Isotta	50	Louis Strang	Marquese	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	Apperson	50	Herbert Lytle	G. E. Davis	2	3	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
8	Acme	50	M. Neustetter	J. P. Price	3	6	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
4	Lozier	45	H. Michener	T. Lynch	6	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
6	Isotta	50	Al Poole	Pepperday	4	4	4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
7	Stearns	30	F. W. Leland	Brewer	7	7	6	6	6	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7	
3	American	50	F. I. Tone	J. C. Linn	7	7	6	7	7	7	6	7	6	7	6	7	6	7	6	7	6	7	6	7	
5	Apperson	50	W. M. McCulla	Wray, Jr.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	



Thomas and Apperson Winners Wore Diamonds

MILES PER HOUR FOR 342 MILES.

No.	Car	Driver	Total Time	Miles per Hour
2	Isotta	Louis Strang	6:21:30	50.70
1	Apperson	Herbert Lytle	6:44:37	46.15
8	Acme	M. Neustetter	6:47:05	45.57
4	Lozier	H. Michener	6:49:17	45.28
6	Isotta	Al Poole	6:58:53	43.90
7	Stearns	F. W. Leland		
3	American	F. I. Tone		
5	Apperson	W. R. McCulla		



'Twas a Prodigious Grandstand, Well Filled.

FASTEST LAPS AND MILES PER HOUR.

No.	Car	Driver	Lap	Time	Miles per Hour
6	Isotta	Al Poole	19th	16:46	61.94
2	Isotta	Louis Strang	2d	17:26	59.00
1	Apperson	Herbert Lytle	17th	18:17	56.25
4	Lozier	H. Michener	2d	18:27	55.38
7	Stearns	F. W. Leland	4th	19:05	53.90
5	Apperson	W. R. McCulla	2d	19:16	53.39
3	Acme	M. Neustetter	9th	19:17	53.34
3	American	F. I. Tone	3d	19:26	52.94



In Two Places the Road Was Bridged.



The American Roadster Rounding a Turn.



Stearns Taking One of the Zig-Zag Turns.

STUDEBAKER AND PULLMAN REACH SAVANNAH

SAVANNAH, GA., March 19.—Mud-bespattered and loaded with equipment consisting of shovels, picks, tackle and the like, all of which showed signs of hard usage, the 30-horsepower Studebaker, driven by Frank Yerger and his brother, Robert, and accompanied by William J. Boyd, as observer, reached here at 4:30 Wednesday afternoon. After officially checking in to President Battey, of the Savannah Automobile Club, the party went to the race course, where they were congratulated by members of the A. A. A. and local enthusiasts, receiving an ovation from the crowd at the stand. The Studebaker also carried dispatches from Commandant R. A. Pendleton, of the League Island Navy Yard, Philadelphia, to Commandant E. D. Taussig, of the Portsmouth Navy Yard, which were delivered en route. The Studebaker's time for the trip was 14 days 8 hours, which represents an excellent performance when the condition of the greater part of the 1,100-mile trip is considered.

The Pullman 40-horsepower roadster, driven by P. T. Gillette and Bob Morton, and carrying A. Daley as observer, did not check in at the De Soto Hotel until 1:35 p. m. Thursday, having required 15 days 5 hours 5 minutes to complete the 1,100-mile journey. After stopping at the De Soto, they drove to the City Hall to deliver a message from Mayor Reyburn, of Philadelphia, to Mayor Tiedeman. Then they visited the scene of the big race, and received applause galore.

The run to Gettysburg and to Washington was made in good time by both cars, and without incident, the drivers not encountering serious work until Centerville, Va., was reached. Both cars were mired several times, and it was a continual struggle through sticky, plastic clay through most of the States. At Fredericksburg, Md., the Pullman was 12 hours ahead, but

by the time Richmond was reached the Studebaker had cut this down to an hour.

From Richmond to Suffolk the cars kept together, reaching the latter place at the same time and leaving in company with Portsmouth as their objective point. The Pullman reached there an hour and a half before its opponent, and as the Studebaker had to wait for repairs, increased its lead, until at Broadnax it smashed the right forward wheel. After stopping for the night at Broadnax, the Pullman went ahead, and never saw the Studebaker again, although the latter reached Savannah first.

The rules of the race, which was run under the auspices of the Quaker City Motor Club of Philadelphia, prohibited the relaying of drivers or departing from the course laid out, and it is understood that the Pullman entrants will prepare a formal protest against the Studebaker on the ground of having violated these rules. This will be presented to the contest committee of the Quaker City Motor Club for action later. The crew of the Studebaker also accuse their competitors of having infringed the rules, and will likewise file a protest.

Some idea of the difficulties of the route may be gained from the fact that on one stretch it took the Pullman 67 hours to struggle through sticky, plastic clay through most of the State. It took 77 miles, and 70 gallons of gasoline were consumed. On frequent occasions, both cars had to enlist the services of horses and mules to extricate them from mudholes which threatened to engulf them entirely, two miles an hour often being considered excellent progress. The worst roads were encountered in Virginia and North Carolina, where a heavy clay soil predominates, the roads getting better as the teams progressed. It soon developed into a day and night race, the crews getting little sleep.



President Battey Greets Studebaker Tourists.



Mayor Tiedeman Welcomes the Pullmanites.



Lytle and the Apperson Southern Runabout Cup Winner.

SAVANNAH, GA., March 19.—Hospitality was unbounded, eloquence ran rampant, and jollity was unconfined at the shore dinner tendered the visiting autoists to-night by the Savannah Automobile Club. It took the form of a Southern shore dinner at the Thunderbolt Casino, to which the guests were carried in autos. The titulation of Northern palates by crab soup and hot Georgia biscuits will ever remain a pleasant memory with the visitors.

His Excellency, Governor Hoke Smith, was there to present the prizes, and prominent State, county, and city officials were also guests. All the talk was of the race, the course, the management, and the chances of the Vanderbilt Cup race coming to Savannah next autumn. Good roads also came in for eloquent exploitation.

Frank C. Battey, the president of the club, presided, welcomed the guests most happily, and then introduced the Governor. His Excellency expressed his thanks to the visitors and also to the Savannahians for what they had done to make the meet a success, declaring it had been of value as well as a pleasure to the whole State. He was most impressed he said by the co-operation of all the citizens in promoting the affair, and the pronounced success which had attended the promoters' efforts.

Messrs. Hamilton, Apperson, and Kiser were then asked to rise and receive the trophies won. Next Strang, Lytle, and Salzman were summoned to receive special bronze medals from the City of Savannah.

Oratory galore followed. Chairman Thompson congratulated the Savannahians on their success. He had seen races in Eng-

land, Ireland, France, Germany, and Italy, and in this country, but none had been better conducted than this one. It took but several hundred Georgia soldiers and a corps of city police to guard the course as effectively as had 7,000 troops the Grand Prix route. The chairman told his hearers confidentially that next to his own State he would vote for Savannah. He said military protection for automobile races cannot be had in New York State because of politics. "Down here you seem to have politics only one way—the good people get what they want," he said. He said that the only trouble he heard of for the whole day was one man who got shot in his toe, "and I suppose he stuck it over the line."

A. G. Batchelder, editor of *THE AUTOMOBILE*, enlarged upon the value of good roads to Georgia and referred to the excellent beginning in Chatham county.

Frank Oliver, counsel to the club, in the matter of securing the course, said that this race would foster the movement for good roads in Georgia. He stated that the county commissioner had told him he would furnish twenty-five to thirty miles for the course if needed.

Gen. Clifford S. Anderson, of Atlanta, a member of the Good Roads Association, declared it was his aim to have Savannah, Augusta, Atlanta, Macon, and the other cities of the State, connected by a great highway.

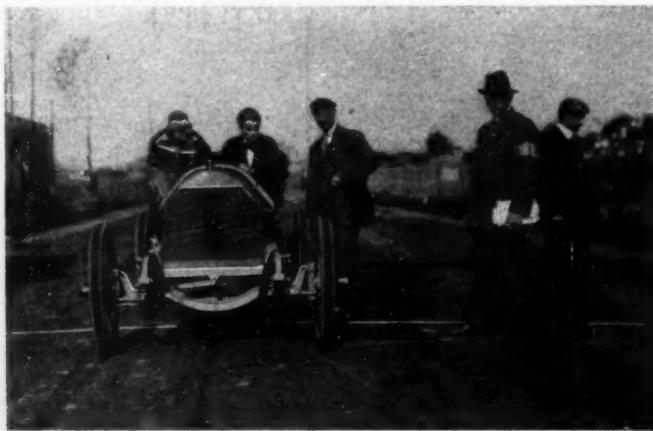
Edgar Apperson declared that the industry needed such stock car races, which most helped makers to improve the kind of cars that people want to buy. John C. Wetmore, the dean of the automobile pressmen, made the humorous speech of the evening, his witty remarks creating a whirlwind of laughter and applause. He told the Georgians that their race was the greatest and most closely contested one ever held in the world.

Secretary F. H. Elliott, of the A. A. A., urged the Savannahians to join with the Atlanta and Macon clubs in the formation of a State association and to use their influence with their congressional representatives in the Judiciary Committee in behalf of the Federal registration bill.

N. H. Van Sicklen, chairman of the A. A. A. technical board, confessed to lack of speech-making ability, but said that he was glad to have been of some aid in helping to make the race successful. H. M. Swetland, president of the Class Journal Company, complimented Savannah and told of the early days of automobiling and related experiences with his first car. J. F. Kiser, whose Thomas won the cup for six-cylinder cars, promised to enter all the races the Savannahians should promote.



Thomas-Detroit, Second in Runabout Cup Event.



Pennsylvania Which Made Fastest Lap Runabout Event.

Resolutions were adopted thanking all who had been instrumental in making a success of the races, the list being a long one. It was nearly midnight when the party scurried back to town in the moonlight. J. D. Rosenheim was the chairman of the committee having the most enjoyable function in charge.

SOME SAVANNAH GOSSIP.

Savannah Club's President on A. A. A. Racing Board.—Chairman Thompson has appointed President F. C. Battey, of the Savannah Automobile Club, as a member of the A. A. A. Racing Board. The appointment was deserved, in view of the Savannah outcome, and Mr. Battey is certain to prove a most valuable member.

Tradesmen Who Were to Be Seen.—The industry was well represented at the Savannah races, the list including the following: Hugh Chalmers, president, Lee Counselman, sales manager, and H. E. Coffin, designer of the Thomas-Detroit Company; Edgar Apperson, Elmer Apperson, and Sales Manager George H. Strout, of the Apperson Bros. Automobile Company, and Sidney B. Bowman, New York representative of the same concern; V. A. Longaker, president of the American Motor Car Company; "Teddy" Housman, traveling sales manager of the Northern Motor Car Company; W. A. Rutz, of the Continental Caoutchouc Company; Walter Christie, the tireless seeker of automobile racing fame, and representatives of the Diamond and Michelin tire companies.

McCulla Tells of His Accident.—Asked about his mishap, William R. McCulla, driver of the Apperson No. 5, said: "I misjudged the speed of my car while attempting to pass the Isotta, and tried to take a sharp left-hand turn too fast. As a result, my car turned over. Absolutely nothing was wrong with the car, and the accident was due entirely to an error in judgment. The only damage done to the car was the breaking of the steering wheel. A temporary repair was made, and the car was driven to the garage under its own power."

Trials of the First Six-cylinder Stearns.—One of the two starters for the six-cylinder event, Wednesday, was E. H. Inman's Stearns, driven by Leland. It was the first of its kind turned out by the Stearns factory, and was equipped with the regular touring gear. Special sprockets had been expressed from Cleveland, but had not been received, so that Leland had to speed his engine up to more than 1,750 r. p. m. This is a terrific speed for an engine the size of the Stearns, and, as it was maintained for some time, the oil in the crankcase became



Salzman and Thomas Six-cylinder Winner Rounding Isle of Hope Curve.

exhausted, and two of the big end bearings "froze," breaking the connecting rods. In the long-distance race, Leland drove Mr. Guerard's Stearns, but was continually harassed by tire troubles. The car was equipped with the ordinary clinchers and common rims, and at one time Leland ran the Stearns round the circuit two complete laps with but three tires on, which made high speed impossible, the race being declared off before the Stearns covered the total distance. Leland was the only Stearns' representative on the ground. Leland, Oldfield, and Vaughan will be the three Stearns' drivers in the Briarcliff race. Vaughan has recovered from his recent injuries, and is now at the Cleveland factory tuning up his car. Oldfield will be on the course next week. Mr. Stearns says of racing: "Of course, racing is a good deal like fishing—some days you catch fish, and some days you don't."

How Tucker Sized It Up.—A. B. Tucker was the publicity man for the Savannah races, and in one of his press sheets, just issued, he comments in this vein: "The races of the past week at Savannah showed a great light for the veterans of the North. When the contingent of American Automobile Association officials, racing experts, and newspaper men arrived at Savannah they experienced a manifest jolt. Much had been written regarding the two days' carnival of speed slated for March 18 and 19, but all that had been published failed to clearly convey the fact that the automobilists of this Southern city, unused to racing matters, and simply following the one rule of 'Thorough,' had made arrangements which could only be described by one word—perfect. The course was the best ever selected in America."



Stearns Six-cylinder Candidate.



In the Shade of the Big Bulletin Board.

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GEORGIA HAS AN UP-TO-DATE GOVERNOR.

It is more than likely that the Governor of Georgia, the Hon. Hoke Smith, is, first of all, something of a politician. Otherwise—in the South, where politicians are born in plenty—he would not be the chief executive of that commonwealth.

But automobilists, one and all, without regard to party affiliations, at the present moment would vote for this particular Smith, no matter what office he might seek in the worthy pursuit of saving State or country.

First of all American governors, the Hon. Hoke attended an automobile road race, unashamed of being seen in the company of automobilists, unafraid of the farmer vote—that bugaboo of the apprehensive applicant for ballots—and even adding to the enormity of his crime by issuing an order permitting the use of the State militia in the guarding of the course.

True the thousands enjoyed the greatest spectacle of modern times, true that no one was injured by the motor-driven juggernauts (?), true that the attention of the whole country has been called to the fact that Georgia has roads good enough for the driving of automobiles over them at the highest rate of speed, and, finally, true that the enterprising city of Savannah has had its business progressiveness and charms widely advertised.

But the stickler for the letter and not the spirit of the law will say that Governor and Mayor exceeded the powers entrusted to them by the people. Hair-splitters of any sort are tiresome; they impede and delay advance;

only strong men interpret laws according to the needs of the hour, assuming implied authority and accepting the responsibility therefor. The roads were built for the use of all the people—including automobilists—and Governor Smith recognized that the commissioners of a county and the aldermen of a city were competent to decide if the temporary employing of the highways for the exploitation and betterment of a new type of vehicle intended for general usage did not unduly interfere with the rights of those who utilized the avenue of commerce and pleasure previous to its appearance on the roads.

Here's to the Governor of Georgia, the Mayor and the councilmen of Savannah, and the road commissioners of Chatham county! Though they shall have many imitators, their names are indelibly inscribed on the roll.



THE PREDICAMENT OF THE OLDEST CLUB.

To insure the success of automobile clubs and to make them subservient to the purposes for which they are organized they must be democratic in character and the membership given frequent opportunity of expression to those elected to carry out policies decided upon in committee on the whole.

It is deplorable that a club like the Automobile Club of America, which might have been a powerful factor for the common good, should now find itself dominated by a small coterie which really places the club in a false position and one exceedingly distasteful to the greater part of the membership. A year ago its plea of needed economy because of removal into its costly clubhouse caused the directors of the New York State Automobile Association to accept temporarily a constitutional change which reduced the A. C. A. dues to \$500. But when it was recently made apparent that the dominant figure of the club's exclusive ring was interfering with the State association's legislative program and peremptorily disregarding the acquiescence of the club's duly authorized delegate in the premises, the limits of consideration and toleration had been passed.

Surely the oldest club of the country is in sore straits under its Shattuckian—almost Pickwickian—government, and if a change is not effected the handwriting on the wall of the unfrequented, expensive home will soon be legible even to its short-sighted governors.



EVOLUTION OF CRANKCASE DESIGN.

Within the past two years it has become noticeable that designers are no longer of one accord concerning that essential of motor design—the crankcase. Evidences seemed to point to the practically universal adoption of the two-piece crankcase of aluminum, and the use of this type is probably more general than that of any other that could be mentioned. There has been more or less talk of abandoning aluminum for this purpose, but thus far it has had no result. Departures have been along other lines. One of these is the adoption of the one-piece crankcase with provision for the insertion of the crankshaft and camshafts, the latter complete with their bearings, from the ends, thus not alone simplifying the motor itself but also facilitating its dismounting and reassembling. Liberal handholes are provided for main-bearing adjustments, and access to the crankcase.

A.A.A. WILL SOON CONTAIN 30 STATE BODIES AND 200 CLUBS.

AN unmistakable indication of the belief in benefits to be derived from organization by automobilists is supplied in a current announcement from the secretary of the American Automobile Association, and is most interesting.

New York.—The Empire State now leads in the number of automobile clubs, and during the past week the Peekskill Automobile Club and the Automobile Club of Ulster County, Kingston, were elected to membership in the New York State Automobile Association, giving that organization a numerical strength of 43 automobile clubs. The Automobile Club of Mount Vernon was formally organized on Thursday last. The automobilists of Yonkers will form a club in the near future, and autoists of many other cities of New York State have similar plans in view.

Ohio.—Automobile Club of Toledo formed, and the Automobile Club of Portsmouth is under formation.

Kentucky.—The Automobile Club of Owensboro and another automobile club of Lexington, known as the Blue Grass Automobile Club, have been organized.

Arkansas.—The Automobile Club of Little Rock is the first club of that State to organize, and is co-operating with the autoists of Pine Bluff and Fort Smith, who are organizing clubs with the view of forming a State association.

Pennsylvania.—The Norristown Automobile Club and the Motor Club of Harrisburg have applied for membership in the Pennsylvania Motor Federation.

Nebraska.—Omaha Automobile Club.

Michigan.—The Flint Automobile Club and the Automobile Club of Kalamazoo have completed organization, and clubs are also being formed in Jackson and Battle Creek.

Maine.—The motorists of Portland and Bar Harbor are expecting to complete the organization of local clubs in their cities within a fortnight.

In many other Southern and Western States similar organization work is being conducted, and it is confidently expected that before the touring season begins there will be affiliated with the American Automobile Association thirty State associations, comprising at least 200 automobile clubs.

JERSEYITES MUST GIRD ON THEIR ARMOR.

NEWARK, N. J., March 24.—The automobilists of New Jersey have definitely come to the conclusion that the only way they can obtain sane automobile legislation is through most thorough organization over the entire State.

Indications point to the probability of the election of W. C. Crosby, of the New Jersey Automobile and Motor Club, as president of the Associated Automobile Clubs of New Jersey, the meeting of which will take place March 31, at Trenton.

A recent letter from Senator Frelinghuysen to Mr. Crosby conveys the information that a recent conference of New Jersey senators decided that the license fee should be raised to \$2 for cars under 10 horsepower; \$5 for cars from 10 to 30 horsepower, and \$10 for any above that figure; drivers' fees to be raised to \$2 and \$4; no tourists' privileges; manufacturers' fee to be \$5 annually for from one to five cars.

Mr. Crosby comments in this strain:

"It will be seen that the automobilists of this State are to get nothing in the form of tourists' privilege, or any change in the present limitation of speed, and will have to pay increased license fees, as well as doubled drivers' license fees; or, to drive a car or anything over 30 horsepower will cost \$14 per annum. The dealers will, if what is proposed becomes law, have to pay an annual license fee of \$5 per car, limited to five cars. The automobilists of this State must, therefore, acquiesce or fight."

ANOTHER CLUB FOR N. Y. STATE ASSOCIATION.

Mt. VERNON, N. Y., March 23.—The Automobile Club of Mt. Vernon is the latest addition to the membership of the New York State Automobile Association of the A. A. A., the organization of the new club having been perfected on Thursday last at a rousing meeting. The officers are: President, William Adams; vice-president, F. A. Merriam; treasurer, Robert M. Van Namee; secretary, F. A. Kately; governors: R. V. Briesen, Wm. McGonigal, W. G. Phillip, J. E. Briggs and A. Schlesinger.

PROBABILITY OF ANOTHER NEW YORK CLUB.

It is among the assured probabilities that there will be another automobile club in New York City for the borough of Manhattan, the general sentiment of automobilists being that a club is needed in Manhattan belonging to the New York State Automobile Association of the A. A. A. The best results in legislative and other matters are assured through local clubs organized into State bodies. As one automobilist put it: "Just as long as the Automobile Club of America is controlled by a self-perpetuating board of governors trying to make the club national in character, which it is not and cannot be under the existing circumstances, there is positive need for a club in Manhattan Borough to supplement the efforts of the Long Island Automobile Club in Brooklyn, the Richmond County Automobile Club on Staten Island, and the Bronxville Automobile Club in Bronx Borough."

ONE AUTOIST'S INTERFERENCE IN NEW YORK LEGISLATION.

ALBANY, N. Y., March 24.—That new and revised Motor Vehicle law is not yet introduced, and will not be till the end of the week. It would have been introduced and printed a week ago had not the draft of the bill presented by the New York State Automobile Association been objected to by A. R. Shattuck, without the sanction of the Automobile Club of America, although the legislators thought he was then representing that New York City club. The suggestions he made for an increased registration fee were sufficient to hold the bill up and call for several conferences; then the Good Roads and Highway Commission bill came along and occupied the attention of Senator Allds, and the bill has not been touched.

It will be amended before introduction to strike the original provisions for penalties for violations by owners and drivers and a simpler penalty provision submitted. The fees for registration, based on weight, will probably remain as they were, or

nearly so, and produce \$300,000 revenue for New York State. The speed limit of the present law will be taken out, and the general common law that no one shall so drive or ride on the public highways as to endanger the life or property of others using the highways will take its place.

It is understood here that the reason for the suggestion to the legislators that automobilists would be willing to pay a registration fee to the State of from \$4 per hundred pounds and up to \$40 a year on their cars is due to the fact that some New York City automobilists, whose residences are in New Jersey, Massachusetts, or Connecticut, but whose autos are assessed as personal property in New York, pay about \$200 to \$235 as a personal property tax on them. Hence, as the proposed registration fee is in lieu of a personal property or other taxation, to pay \$40 to the State instead of \$235 is personally economical to those seemingly most interested in this proposition.



Through the Sage Brush of the Utah Plains.

THOMAS COMPLETES TRANSCONTINENTAL.

SAN FRANCISCO, March 24.—Amid scenes of the wildest excitement ever witnessed in connection with an automobile event, the Thomas car made a triumphal entry into this city at 4:30 this afternoon, its total elapsed time in crossing the continent being 41 days 8 hours and 15 minutes, which compares very favorably with the one-man record made under the best weather conditions, despite the fact that the Thomas made a detour of 900 miles to the south, bringing the total distance covered to 3,832 miles. Seldom have contestants in any sporting event been accorded a more enthusiastic reception than was the portion of Harold Brinker, George Schuester and the rest of the Thomas crew. San Franciscans have been awaiting the arrival of the car for several days past, and large crowds waited until a late hour last night. They were out again the first thing this morning, so that when the car finally struck Market street its progress was arrested by the hundreds who wished to personally congratulate Brinker and his comrades, and the police were practically helpless.

The last stage of the continental trip consisted of the 100-mile run from Los Baños here, and it was one of the best stretches in the entire trip since leaving New York. The boulevards in Alameda county were in fine condition, and part of the distance was covered at the rate of 40 miles an hour. There was a large procession of cars for the entire 50 miles from San José. On a smaller scale, the same scenes were enacted in Oakland as here, and it was with difficulty that the Thomas car got to the ferry. The car will remain here for a thorough overhauling, and will be shipped to Seattle in time to take the boat to Valdez, Alaska, which sails on April 1. George Schuester will take charge of the car from now on, and expects to find the Alaskan rivers frozen, so that they may be used as highways, otherwise he does not expect to be able to make a great deal of progress until fall.

The Thomas success is not alone a great triumph for that car, but one of the greatest that has ever been achieved by the automobile, as it was generally predicted at the start that none of the contestants would ever get across before spring. What making the trip across the continent in the dead of winter in such a short time means may be realized from the fact that the Thomas record is little more than eight days longer than that of Whitman and Carris, of 32 days 23 hours and 40 minutes, made in a Franklin.

Daily mileages are becoming greater as the Thomas car gets further West, as on Wednesday, March 18, which was the thirty-sixth

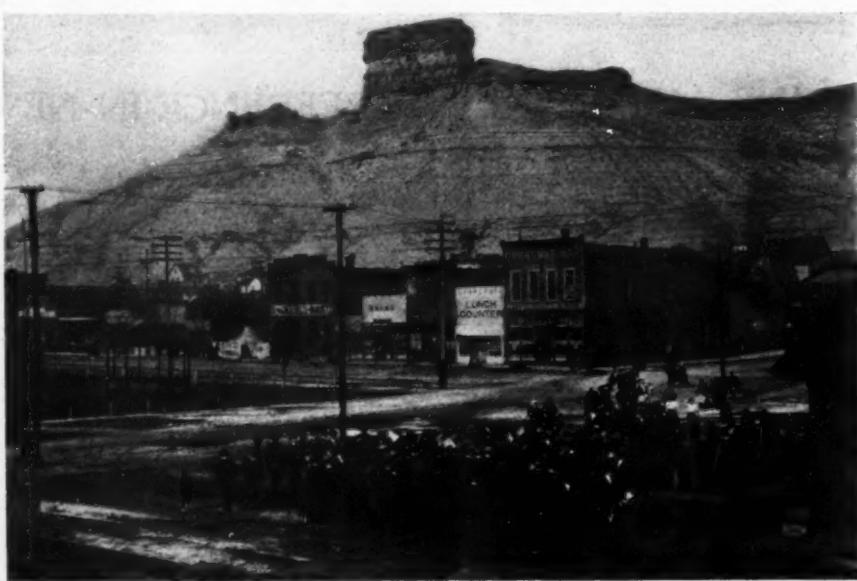
day of the race, the car covered 141 miles, arriving at Ely, Nev., and pushing on 40 miles further before stopping for the night. The telegraph wires were left behind at this point, the next point of communication being Goldfield, Nev., 185 miles distant. The Pierce acted as pilot as far as Ely, the little Reo "rabbit" having lost two tires at Cobre, which could not be replaced. For the stretch to Goldfield, another Thomas acts as pilot car. The Züst, which is now about 500 miles behind, came near ending its chances for good March 18, only the quick wit of the driver and the fact that the axle caught on the brink preventing the car and passengers from going into a ravine.

Goldfield went wild over the arrival of the Thomas, which did not reach there until Saturday morning, owing to being stalled in the mud west of Ely, and later breaking a differential pinion. The whole population stayed up the greater part of the night, awaiting the racer, but was disappointed. The Thomas made the run of 30 miles from Tonopah in 58 minutes, and was greeted on its entry by the ringing of the fire bell, which was the signal for the gathering of the various entertainment committees. The entire town was decorated.

When near Spring Valley, Wyo., the Züst crew found themselves followed by a pack of timber wolves, and only succeeded in driving them off by shooting twenty, the pelts of which will net the ranchmen who gathered them next day some \$200 in bounties. Its arrival in Goldfield placed the Thomas 605 miles ahead of the Züst, which passed Evanston, Wyo., the same day. The DeDion was then at Cheyenne, Wyo., 1,013 miles back; the Protos at Ogallala, Wyo., and the Motobloc at Carroll, Ia., where it gave up and was shipped by rail. The Union Pacific officials would not permit the Züst to use the railroad right of way or go through the Aspen tunnel, because of the damage done the loose gravel ballast by the Thomas. Sirtori was compelled to take his car over the mountains and has made this the ground for a protest.

The car crossed the California line Saturday, March 21, and then had 800 miles between it and San Francisco. It had been expected to reach there in time to take the train for Seattle Saturday night, but the accident on the Nevada desert, when away from telegraphic communication, spoiled its chances. E. R. Thomas, of the Thomas Company, awaited the arrival of the car all day Sunday at Dagget, Cal., but Brinker made a short cut over the mountains to Mojave, where his arrival was quite unexpected. The mileage for the last seven days:

Car	Country	Day 36	Day 37	Day 38	Day 39	Day 40	Day 41	Day 42
Thomas....(America)....	2,859	2,859	3,065	3,119	3,451	3,632	3,832	
Züst.....(Italy).....	2,390	2,390	2,460	2,536	2,536	2,616	2,636	
De Dion....(France)....	1,690	1,878	2,052	2,166	2,226	2,345	2,390	
Protos....(Germany)....	1,627	1,767	1,878	1,950	2,109	2,109	2,226	
Motobloc... (France)....	1,439							Shipped by rail, March 18.



Arrival of Thomas at Castle Rock, Green River, Utah.

MULTIPLE UNIT SYSTEMS OF TRANSPORTATION*

By JOSEPH A. ANGLADA, MEMBER SOCIETY OF AUTOMOBILE ENGINEERS.

WITHIN the past few years it has been proven by users in general that, aside from the advertising value of commercial automobiles, which exists in few cases at present, the employment of auto trucks of over 6,000 pounds load capacity is not as profitable as the employment of smaller vehicles. The rapid depreciation of rubber tires in general use, and of the power-generating apparatus, necessitating frequent repairs and replacements, are the chief reasons for the above state of affairs.

A few vehicle manufacturers and users have attempted to solve the problem of expensive tire renewals by the use of various types of wooden and combination tires, and the use of resilient wheels. However, considering that by far the greater number of commercial automobiles of all types are still using and being equipped with rubber tires of the same general type used for the past eight or ten years, it seems that solid rubber tires, expensive as they are in all respects when used on large vehicles, are at present the most satisfactory solution of the problem. An objection to fabric and wooden tires is that, while they perform the work required of them, they disintegrate more rapidly than is commercially allowable, and because of their comparatively non-resilient materials, the tires become loose in the fastenings securing them to the wheels. The inability to absorb the rapid blows produced by encountering small inequalities of the road surface also counts seriously against these tires.

Various forms of combination tires, such as an outer solid tire of a comparatively tough material, which rests upon a pneumatic or spring cushioned part, and spring wheels of various types have been tried, but, as stated above, the old-style solid rubber tire is still the most satisfactory. A form of composite tire is shown by Fig 1. This tire was tried for a while on a fifteen-ton brewery truck, but failed because the parts were not properly proportioned. It consists of a solid rubber tire of the usual form, capable of carrying about one-half the total weight on the wheel. This tire is placed centrally between two steel tires designed to slightly more than carry the balance of the weight. The rubber tire is intended as the traction furnishing and resilient member because it projects slightly beyond the steel tires. The steel tires will protect the rubber when additional loading of same would be injurious. For instance, when crossing a street car track with the ordinary rubber tire the pressure is concentrated on a small section of the tire with occasional injurious results. In fact, in the majority of cases with large vehicles the tires are seldom considered worn out because the tire has worn down to a small cross-section, but because the tire has been split in places and chunks of rubber have been cut out, or the fastening is no longer secure. The steel tires in combination with the rubber should not permit this to occur. However, in my estimation, it will require a long time and the expenditure of a large sum of money to develop a thoroughly commercial tire for a vehicle exceeding three tons load capacity.

Another objection to the use of large trucks is their inability to exert sufficient tractive effort under all conditions of loading and road surface. As a remedy, some manufacturers furnish sand boxes for delivering sand under the driving wheels,

as in railroad practice, while others endeavor to overcome this difficulty by driving all four wheels. The first method is an unsatisfactory makeshift, while the latter necessitates expensive complication of the propelling and steering mechanisms, with the extra weight of these parts assisting depreciation.

The six-wheel vehicle is a step in the right direction, but the complication inseparable from this arrangement and the expense of building and maintaining this complicated construction detracts seriously from the attractiveness of the six-wheel proposition. Unless at least four wheels are driven, the traction disadvantages of the two-wheel drive are always present. When four or six wheels are driven, the objections stated above also count against this system.

The system employing a tractor and trailers is used abroad to some extent, and has the advantage of distributing the load on a number of wheels. But the objectionable feature of having but one pair of driving wheels counts seriously against the system; because unless the driving wheels are provided with cleats to assist propulsion, it is impossible to haul a paying load at all times, and even with cleats above it is not possible if the road has deep sand or mud upon it. The use of cleats is objectionable because they cause the load on the driving wheels to be concentrated on comparatively small areas of the road surface, causing it to deteriorate rapidly.

Colonel Renard realized the shortcomings of the above system when he developed the road-train system which bears his name. It consists of a train of vehicles, the leading vehicle having mounted upon it the power-generating, speed-controlling and steering apparatus. A shaft arranged with the proper number of universal and slip joints extends throughout the length of the train and transmits the power for propulsion to the driving wheels of each vehicle. Thus it is possible to carry a large and, therefore, a well-paying load without having excessively large individual vehicles, causing rapid depreciation of same due to the inability of providing resilient tires or wheels or springs for carrying heavy loads. The road surface is also protected, because the unit load on the same is reduced, the weight being distributed on a greater number of wheels and therefore on a greater area of road surface. In addition, rubber tires are not necessary, because sufficient tractive effort is obtained by the increased number of propelling members. Steel tires may be used on the trailing vehicles, because there is no mechanism except the comparatively simple propelling and steering apparatus mounted on them, and on the leading or power-furnishing

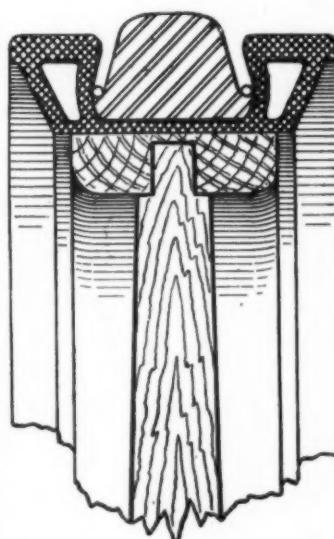


Fig. 1.—Combination steel and rubber tire.

*Paper read before the Society of Automobile Engineers at Boston.

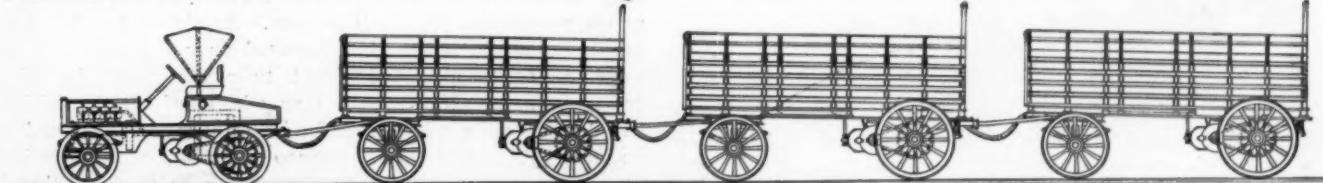


Fig. 2.—Elevation of gasoline-electric power wagon and independently driven, self-steering multiple units.

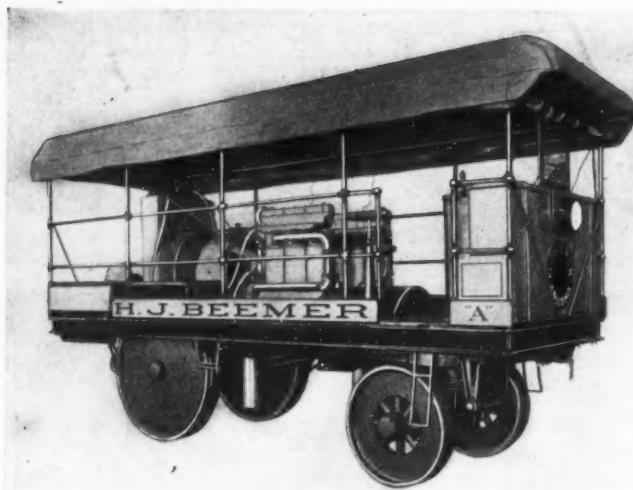


Fig. 3.—Gibbs gasoline-electric power wagon, used for mine haulage.

vehicle rubber tires are allowable, because in no case should the weight of the vehicle complete with apparatus weigh more than three tons. It seems to the writer, after studying the Renard system, that its advantages may be retained and the complication of the power-transmitting and controlling apparatus reduced and these parts made more efficient by the use of the system shown diagrammatically by Fig. 2.

The leading vehicle has mounted upon it the steering and control apparatus, a source of motive power, storage battery, steam or internal combustion motor, but preferably the latter, on account of its simplicity and small weight per horsepower. The motor is coupled to an electric generator which furnishes current to a pair of electric motors on each vehicle. The vehicles are connected by means of a bar which transmits the steering effort from the drawhead at the rear of the leading vehicle to the front axle of each following vehicle. The length of this bar and the position of the front axle are so determined in reference to the rear axle of the leading vehicle, that the entire train follows the same course when turning. The vehicles are also connected by flexible electric conductors, arranged so as to be readily connected or disconnected when it is desired to place a vehicle in or out of the train.

Three methods of control suggest themselves:

First, the ordinary method of operating the internal combustion motor at a constant speed to obtain a constant voltage at the generator, and then, by means of a series-parallel controller, connecting the fields and armatures of the motors in various combinations, virtually as done in street car and electric

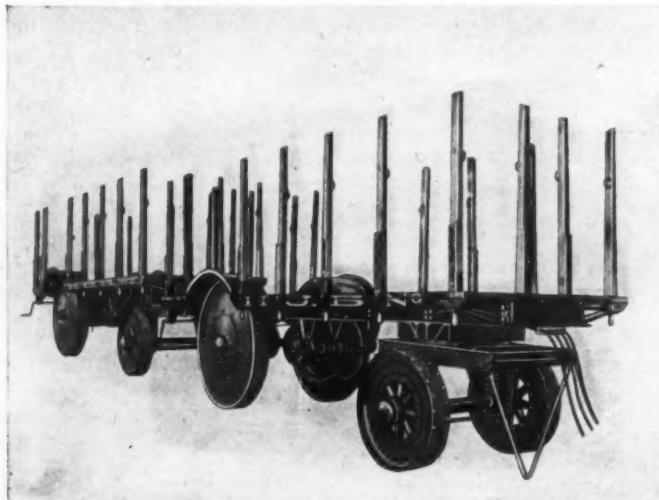


Fig. 4.—Gibbs electric units used with foregoing tractor.

train service on elevated and subway lines at the present time.

Second, a method in which by varying the speed of the generator its voltage is varied correspondingly, causing a proportional current to flow through the motors, making their speed and torque vary.

Third, a method whereby varying the voltage of the generator, by changing its field excitation, its speed meanwhile remaining constant, causes an effect similar to that of the foregoing method. It would probably be found advisable to obtain the field current for the generator from an exciter mounted on the end of the main generator shaft, to save weight, and having its output controlled by the driver of the train.

With the two latter methods, it would also be found advisable to provide a switch for connecting the two motors on each vehicle in series combination for climbing grades and for starting when the train was fully loaded. This switch could also be used for reversing the direction of rotation of the vehicle motors.

The generator should be designed to furnish a direct current at 220 volts and the windings should be so arranged that when the output of the generator nearly equaled the output of the gas motor, the voltage of the generator would decrease and thus decrease the current flowing to the vehicle motors. This feature, while not absolutely necessary, is desirable because at no time is it possible to overload and stall the gas motor by careless operating. For instance, consider that the motors of the train, which are 220-volt direct-current series motors, are operating in multiple combination, and that the train approaches a grade which requires more power than the gas motor can furnish to the motors in multiple combination. The generator voltage would decrease and thus prevent the vehicle motors and the gas motor from being overloaded, and if the driver should persist in not operating the switch to connect the vehicle motors in series combination, the train would come to a standstill if the power required was greatly in excess of what the gas motor can supply. It is seen that by connecting the vehicle motors in series combination the effect of changing to a lower gear of about twice the reduction is obtained with a corresponding drop in speed and increase of torque.

It is generally known that in the existing types of electric commercial vehicles the chief, and, in fact, generally the only feature which prevents them from being ideal is the battery. The motor rarely, if ever, gives trouble and requires little attention; therefore, it seems that, with the exception of the generator, the reliability of which is beyond suspicion, the only other parts of the electric system which might give trouble are the conductors carrying the current to the motors and the controller, of whatever type it may be. The reliability of these is proven by the successful daily operation of such apparatus on railways.

A train such as here described would be useful for many purposes. Besides being adapted for the transportation of goods and passengers in sparsely populated sections, it would be quite suitable for use in congested districts, owing to the ease of control, combined with its ability to accelerate and stop quickly, due to the fact that each vehicle is self-propelled and braked.

The train would not weigh more than a train equipped with an entirely mechanical transmission, and would not cost as much to build. It would operate more efficiently and the cost of maintenance would be less.

In this country multiple unit road trains have been constructed by the Gibbs Engineering and Manufacturing Company and Alden Sampson. The first Gibbs train consisted of a power wagon and two trail wagons. As shown by the photograph, the power wagon has mounted upon it a three-cylinder gasoline engine direct connected to a generator furnishing power to motors driving the rear wheels of all the vehicles. The leading vehicle is equipped with solid rubber tires and the trailers have iron tires. The speed of the train was regulated by a two-motor street car type controller so modified that by operating the drum intended for reversing the car motors, the

vehicle motors, which were regular series wound electric vehicle motors, would be connected in series or multiple combination. The main drum of the controller was used to connect resistance in or out of the motor circuit. No provision was made for reversing the trailers, but separate switches were provided for that purpose on the power wagon.

The second Gibbs train consists of a power wagon and four trailers. The power wagon has mounted upon it two three-cylinder gasoline engines driving a double commutator generator through positive clutches on the engine shafts and Morse chains. The rear wheels of all the vehicles are driven by series motors through gearing and roller chains. The photograph gives an idea of the construction of the road wheels, which are steel discs flanged at the outer circumference. The discs are riveted to bronze bushed steel hubs and steel tires eight inches broad. Speed regulation is obtained by means of a controller similar to the one used on the first train, with the exception that the controller drum generally used for reversing the car motors is in this case used to connect the two windings on the armature of the generator in series or parallel. The main drum

ELECTRICAL MEASUREMENT OF TEMPERATURES.

PROFESSOR H. L. CALLENDAR and W. E. Dalby described in a paper recently read before the Royal Society a form of platinum thermometer which measures directly the temperature of the gas in the cylinder of a gas engine at some one point of the cycle, says *The Engineering Digest*. In order to avoid uncertain corrections, it is necessary in any attempt on this problem to employ wires fine enough to follow the changes of temperature of the gas very closely during suction and compression. If such a wire be employed under working conditions, it must be perfectly screened from the flame during explosion. The arrangement designed by the authors is such as to introduce the thermometer into, and withdraw it from, the cylinder at the proper instants, and to do this without making any change in the usual form and extent of the clearance surface during the time interval comprising the end of compression. The thermometer itself consisted of a loop of platinum wire 0.001 inch in diameter and 1 inch long, and a compensation loop of similar wire was provided to eliminate the end effects arising from conduction to the leads. The current employed in meas-

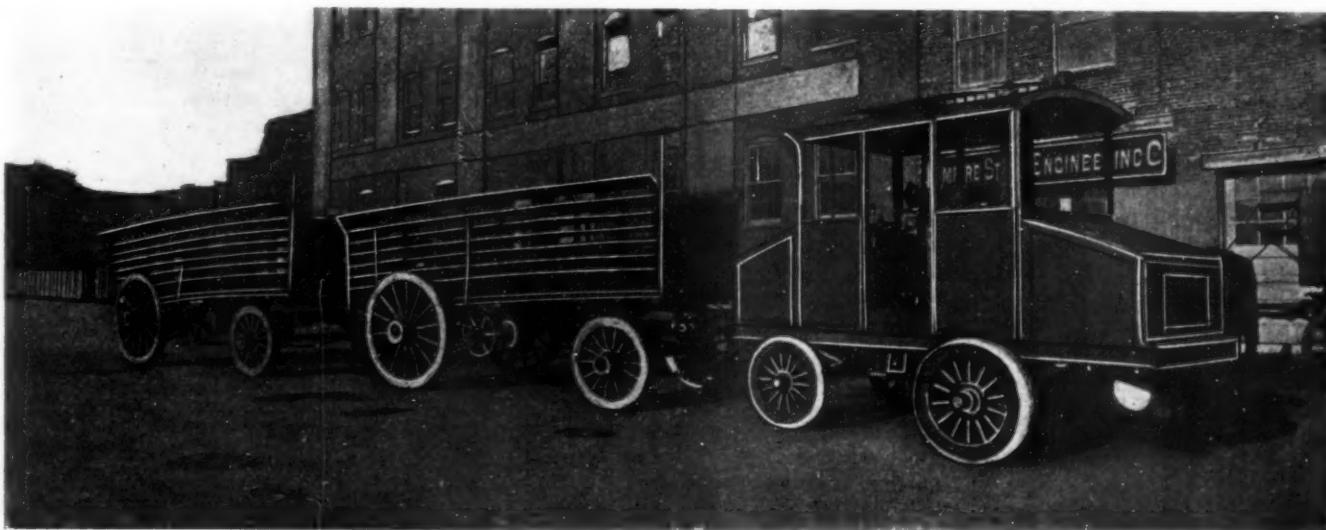


Fig. 5.—Another example of the same type of gasoline-electric road train made by the Gibbs Engineering Company.

of the controller is used to connect resistance in or out of the motor circuit. Each vehicle has a switch for reversing the motors.

This train was used to transport machinery and supplies from a railroad to a mine in Arizona. The route is one hundred and fifteen miles each way and leads through a desert and mountainous country.

The Alden Sampson train, which was exhibited at the last Madison Square Garden show, consists of a power wagon and two trailers, the former carrying a four-cylinder gasoline motor, driving a dynamo by a silent chain. The power plant, which occupies the forward part of the vehicle, is mounted on a separate spring-suspended frame, while the rear part is arranged for carrying a load. All the vehicles are of the six-wheel type, the large center wheels being independently driven on all of the vehicles. In its general features the train resembles the Renard type, the chief difference being that the French train is mechanically and not electrically driven. The trailers are double-ended, so that they may be operated in either direction.

It is a mighty poor plan to come to the conclusion that just because a certain thing about the motor was the cause of defection but a short time previous, it is again to blame. Some amateurs get "carbureter crazy"; others are afflicted with a streak of "batteries"—they can't imagine a condition of affairs that a bad battery did not contribute to, and so on down through the list, different drivers getting various ailments.

uring the change of resistance (which was practically 1 ohm for 100° C. rise) was about 1/200 ampere. This thermometric arrangement was contained in a small valve inserted through the spindle of the admission valve, which was bored out to receive it. This thermometer valve was introduced into the cylinder by a cam operated by a simple gear. In order to measure the temperature at a definite point of the cycle, a periodic contact-maker was inserted in the testing battery circuit. This consisted of two cams on the same axle and two brushes. The shape of each cam was a flat spiral, which lifted the corresponding springy brush away from the axis as the shaft rotated, and the spirals each terminated with a step which allowed the brushes to fall suddenly. The steps were staggered in angle, so that the brushes fell at different instants. As one side of the electrical contact was carried by one brush, and the other side of the contact by a projection on the second brush, by setting the cams initially at the proper angle, any desired period of contact could be brought about at any desired point of the gas-engine cycle. This method has the advantage that it can be applied without difficulty to any existing engine by simply making a special admission valve. It is absolutely necessary in such investigations that the engine should repeat a perfectly regular cycle at each explosion. No results of any value can be obtained with a hit-and-miss governor in operation, because the conditions vary too greatly from stroke to stroke, and it is manifestly impossible to arrive at any definite conclusions from records made with an engine that is seldom twice the same.

GYROSTATIC ACTION—ITS EFFECT ON STEERING*

By WILLIAM W. WATSON, D.Sc., F.R.S.

THE motions of a gyrostat are to most persons a subject of very considerable interest on account of their apparently mysterious nature. The wheel seems, when in motion, to possess volition of its own, and while setting at defiance all the laws of Nature, only obeys some law such as that followed by the Irishman's pig. On account of this mysterious behavior of the gyrostat it has often been suggested as an "explanation" of various events the causes of which are unknown. Thus, when the *Cobra*, the first destroyer to be fitted with turbine engines, was lost in the North Sea, the hull having apparently broken in two, it was suggested that the gyrostatic action of the rapidly rotating turbines had caused such a severe stress as to fracture the hull. In the same way the Salisbury railway disaster was by some attributed to the gyrostatic action of the wheels of the locomotive. Finally, gyrostatic action has been suggested as affecting the motion of a motor-car, and in this paper I propose to consider in what ways and to what extent such an effect is likely to be produced.

An elementary explanation of the action of a gyroscope can easily be given, and will be easily followed if the following considerations are kept in mind. When a body is in motion every autoist is acquainted with what is meant when we say it possesses momentum, and that this momentum depends both on the mass of the body and the velocity with which it is moving; and to change the momentum in any direction, we must act on the body by a force in that direction. Further, the change in momentum produced in a given time is equal to the product of the force which is causing the change into the time. In the case of a rotating body we have a similar set of considerations which may not be quite so familiar. Thus every rotating body possesses angular momentum, which depends on the velocity of rotation, and what is called the moment of inertia, which itself depends on the mass of the body and the distances of the various parts of the body from the axis of rotation. The angular momentum of a rotary body has not only a particular value for any given speed of rotation, but it has also a definite direction—namely, that of the axis about which the rotation is taking place. To change the angular momentum of the body we have to exert a twist or couple, and the magnitude of the change in angular momentum about any axis in a given time is equal to the product of the value of the couple into the time. Finally, we must remember that the angular momentum about any axis may be increased in two distinct ways—either (1) by increasing the speed of rotation about this axis, or (2) by so tilting the body that a spin, which already exists about some other axis, is changed so as to be more nearly coincident with the given axis.

It has often been suggested that the gyroscopic action of the flywheel on an automobile, particularly in the case of horizontal engines with heavy flywheels and having the axis of rotation athwartship, may tend to appreciably assist in preventing side-slip. It has been shown that such an action will only occur if the axis of rotation of the flywheel can tilt when the car rotates. This tilt can only occur by the give of the springs, and it is a matter for calculation to see if any appreciable effect can occur. Although a rigorous calculation would be a matter of enormous difficulty, an approximate solution is quite easy. This approximate solution is sufficient for our purpose, for it will give an upper limit to the quantity required, and, as we shall see, even this is insignificant. The author has taken the numerical data from his own car, which has a single-cylinder horizontal engine.

The weight of the rim of the flywheel is 80 pounds, its outside diameter 20 inches, and moment of inertia 46 foot-pounds, the speed of rotation being 1,000 revolutions per minute. A

couple of hundred pounds at an arm of one foot will tilt the car through seven minutes of arc. Now, suppose the car starts turning, and completes a whole turn in one second, the speed of rotation increasing at a uniform rate throughout. Then the outside value for the gyroscopic couple resisting turning is about six pounds at an arm of one foot. This is quite insignificant, and is so small because of the fact that the springs of the car prevent the axis of the flywheel tilting. This effect was illustrated by a small model car, fitted with a heavy flywheel. When the axis of the flywheel is clamped to the *chassis*, so that the only tilt that can take place is due to the give of the springs, the model side-slips just as badly when the flywheel rotates as when it is at rest. When, however, the axis of the flywheel is allowed to tilt with reference to the *chassis*, only being restrained by a light spring, then the gyroscopic effect comes into play, and the model no longer side-slips.

Another problem is to the effect of the gyroscopic couple called into play when the car rounds a curve. The ratio of the gyroscopic couple to the centrifugal couple tending to capsize the car is—

$$\frac{C n}{V h W}$$

where C is the moment of inertia of the flywheel, n its angular velocity (radius per second), V the speed of the car in feet per second, h the height of the center of gravity of the car above the ground, and W the weight of the car. Taking W as 1,900 pounds, h as 2 feet 9 inches, and the flywheel being that already considered rotating at 1,000 revolutions; then the ratio at 10 miles per hour is .056, at 20 miles per hour is .028, and at 30 miles per hour is .019. Here, again, the effect is insignificant.

Finally, we have to consider the effect of the gyrostatic action of the front wheels in the steering. When a front wheel goes over a stone the axis is rotated, and hence a couple is produced tending to turn the wheel in the direction so as to steer the car away from the side struck, and this effect tends, with the ordinary form of that axle, to reduce the shock in the steering connection produced by the impact with the stone. Taking a 760 by 90 mm. wheel, which has a moment of inertia of 31 foot-pounds, a car having a tread of 56 inches and proceeding at 30 miles per hour; then if we suppose the wheel to lift one inch while the car moves forward two inches, the gyroscopic couple would be equal to 320 pounds at an arm of one foot. This might be of some effect, only the example taken is certainly an extreme case, for the pneumatic tire would decidedly prevent any such rapid rise of the wheel. Further, as has been already pointed out, the blow of the wheel striking the stone will cause a couple in the opposite direction to the gyrostatic couple. It will thus be seen that under present conditions the gyroscopic action of the various rotating parts of a car produce no appreciable effects. If, in the future, cars are driven by gas turbines, which will almost certainly be of the De Laval type—it may, however, be otherwise.

The model exhibited shows one way in which gyroscopic action may be used to minimize side-slip, but the method is not a practical one, for the size and weight of the gyrostat when used in this way would be prohibitive. If, however, the Brennan arrangement were employed, a comparatively small gyrostat would be efficacious, and in the event of all studded tires being prohibited, might be found worth the additional expense.

From what has been said it will be seen that in the use of the automobile, which, of necessity, possesses such large lateral stability, gyroscopic action is of little practical importance. When, however, we come to the submarine and aeroplane it is quite otherwise, and gyrostatic action will have to be taken into account, or eliminated by the use of twin engines.

*Paper read before the Royal Automobile Club, London.

LETTERS INTERESTING AND INSTRUCTIVE

SOME FRAME WEIGHTS COMPARED.

Editor THE AUTOMOBILE:

[1,256.]—For some time I have been considering the purchase of a well-known American car, which I am satisfied is of the highest grade in every respect, except possibly in the fact that it has a wooden frame. However, the local agents for this car not only claim a reduction of vibration and other merits for this frame, but actually contend that it is stronger and lighter than a steel frame. Now I know that in the earlier history of the automobile industry wooden frames were very common, yet to-day only a few manufacturers persist in using them. Surely there must be some very good reason for this, and, if there is, naturally I am going to consider it in the purchase of a car. So I am writing to ask you your opinion on the wood frame matter, with a view to learning on good authority whether it really possesses the advantages claimed—especially the ones I have mentioned—and of finding out what the objections are that offset these advantages.

Covington, Ky.

CARL MILLIKEN.

The great objection to the wood frame always has been the difficulty of making the various attachments between its parts and the elements that must be mounted upon it as strong as the wood itself. Wood, of properly selected and high qualities is, weight for weight, one of the strongest structural materials known, comparing favorably with alloy steels in this respect. This is because its porous microcellular structure is practically equivalent to an enormous number of minute trusses, by means of which weight is kept down and resistance to transverse, compressive and torsional stresses, as well as to those of tension, is abundantly provided. An idea of what this amounts to practically can be had from the fact that an ordinary channel frame member four inches deep, two inches wide and one-eighth of an inch thick weighs more for each running inch than a solid pine beam two inches thick and eight inches deep. In this connection it is interesting to note that some of the very lightest wood—pine, spruces, ash, etc.—are the strongest; oak, hickory, and other hardwoods, though stronger for a given size, being less strong in proportion to their weight. A further advantage of wood over most steels is its dynamic resistance, it never fracturing without considerable bending and ample warning. It is, moreover, both easier and cheaper to repair. As for the merit of wood frames on any particular car, the question is one to be decided largely by individual preference and by the reputation of the manufacturer. A few designers have undoubtedly perfected remarkably substantial methods of joining wood frames together, and, though it is true that these frames are found in only a few makes of cars, it is to be remembered that some of these makes are ones especially noted for enormous outputs of most serviceable machines, so that the wood frame is regularly giving satisfaction in many quarters.

FURTHER CORRECTIONS FOR DR. HARD.

Editor THE AUTOMOBILE:

[1,257.]—In the issue of March 12, letter No. 1,229, signed by A. D. Hard, he says, "the faster the wheels turn the motor, the greater will be the resistance to be overcome, and the slower the car will move," and then says, "if we wish to use the motor as a retarder to car movement, we will get the greatest service by using high gear." If he means maximum braking effect by "greatest service," it seems as if he has made a mistake, even if he is a mechanical engineer and writes on the practical side, for the motor will be turned faster by the car on the low gear than by the same speed of the car and the high gear. It is a natural mistake, but high gear doesn't mean a big gear ratio between the engine and road wheels, but a small difference in speed between the engine and the wheels.

A SUBSCRIBER.

Kingston, R. L.

Mr. Hard is an "M.D." not an "M.E." the latter being a typographical error that went through unnoticed in the issue in which the letter referred to was published.

CAUSE OF LAMP MIRRORS BREAKING.

Editor THE AUTOMOBILE:

[1,258.]—An acetylene headlight that I use on my car has been found to have a cracked mirror, which I contend must have resulted from an original flaw in the glass or some similar cause, as there has been nothing else that could have produced the break. The matter has been the occasion of some argument with the dealer who sold the lamps, he contending, in justification of an unwillingness to replace the mirror, that it probably broke from heat, as by putting in too large a burner or by having too great a gas pressure. Since the lamp has been in use for some months under absolutely uniform conditions, with the gas supplied by a carefully regulated Prest-O-Lite tank and there has been no change in burner or adjustments, I cannot see it this way, and would like to know if you can suggest anything that will be positive evidence of just what occurred. I have always understood that these mirrors are of a heat-proof glass and that it is not possible for them to crack in the manner of an ordinary lamp chimney unless flawed or defective to begin with.

JOE FINK.

Atlanta, Ga.

The fact, as you state it, that the lamp was in use for months without trouble constitutes proof that is almost positive to the effect of something happening just prior to the breakage. There is no such thing as heat-proof glass, the heavy lead glass usually used for lens mirrors being simply more heat-resisting than other kinds. But even it will break when unequally heated to a sufficient degree, which might have resulted in any one of several ways. Have you lit the lamp since the mirror broke? If not, we think you will find that the arm of the burner tip nearest the mirror is stopped up from dust or carbonizing, with the result that the flame from the opposite arm has not been stopped by the other impinging upon it, but has shot across and overheated the mirror. This is a common cause of the trouble you speak of, and can happen when the rear arm is completely obstructed or just enough so to destroy the balance of the flame.

WIRELESS TELEGRAPHY IN AUTO ENGINES.

Editor THE AUTOMOBILE:

[1,259.]—Can you tell me if any satisfactory explanation ever has been offered for the increase of power that results with both sections of a double ignition system working at once? I have a car fitted with both high and low tension ignition, and I find that when it is running on either ignition, set switching or the other, in addition gives a material increase on the power—especially noticeable in hill climbing, for instance. At first I thought the effect was due to the more rapid ignition of the magneto that furnishes the low tension ignition, but subsequently I found that the same result was produced when, while running on the magneto, the battery system also was brought into action. I am pretty familiar with most ignition theory and practice, and am especially disinclined to subscribe to the "fat" spark creed, which might afford a possible explanation of the condition which I have encountered and which, I am led to understand, has befallen the experience of many other car users. An electrical engineer of my acquaintance suggests that the merit of two ignition systems, whether twin or different, may possibly be due in some way to Hertzian waves produced by one discharge, breaking down the resistance adjacent to the other—a sort of wireless telegraph effect, so to speak. And this friend further advances the startling opinion that the merit of the once popular spark gap may have had its explanation in a similar principle. Do you know of any data—corroborative or contradictory of these suggestions—that throws any light on this interesting subject? I am sure that there are many others besides myself who will read any information you can dispense or produce.

Austin, Texas.

C. E. ENGLEHART.

Your letter certainly raises a number of interesting questions, upon which we shall be pleased to have our readers' comment. The idea of a Hertzian-wave effect, while at first consideration apparently very far fetched, may after all have much of merit in it. This much is certain—there is no man living who knows all that really goes on within the cylinders of an internal combustion motor; which being the case, no one can deny much more

positively than another can affirm the supposed facts on any given proposition of sufficient abstrusity. Some time ago a Frenchman patented the idea of employing a disruptive discharge outside the cylinders for the purpose of lowering the resistance inside, but beyond this single fact we know of nothing definite on the subject. A very little experimenting would throw more real light on the matter than pages of speculation, and it is not impossible that some information may be in possession of people who will read this. For instance, some one may have noted whether or not there is a difference in the value of the spark gap at different distances from the cylinders. It assuredly could be argued that if a fairly powerful discharge can be made to procure a lowering of the resistance between loosely-contracted iron filings thousands of miles away, at least as much might be expected from a less powerful discharge, acting upon a very short air gap only a few feet away. And the fact of the effect appearing, despite intervening walls of metal, would be no violation of anything that is known of the principles involved in wireless telegraphy.

MORE ABOUT BRAKING WITH THE MOTOR.

Editor THE AUTOMOBILE:

[1,260.]—I am inclined to think that Mr. Hard has made a slight mistake in his letter No. 1,229, relating to the use of the motor as a brake. Accepting the theory that the braking effect is produced by friction of motor action, I believe that we would secure greater resistance by placing the low gears in mesh instead of the high, which he suggests. Mr. Hard can certainly see that the motor would revolve more rapidly, or a greater number of times in a given distance of car travel, by driving it through the low gears than by driving it direct or through intermediate gears, consequently more friction would be produced, which is the desired result. His statement in regard to using the motor as an emergency brake after coasting with motor released, while true in a certain way, is slightly misleading. The impression is given that if in an emergency it should be necessary to use the motor, the liability of damage to gears and motor would be less by using the low gears. Owing to the great difference in peripheral speed of the low speed pinions, the liability of damage would be greatest in using this set and in a descending ratio until least in the high speed direct drive, where the shock is taken by a jaw clutch instead of gear teeth. This correction applies more generally to the sliding gear types of gear changes, but is true of the planetary as well. I do not believe that good practice will permit of motor-braking through any gears other than direct drive.

In case I am wrong in this, I would thank you for an explanation.

ANONYMOUS.

There is naturally less resistance to be opposed to a shock when the motor is started with the high gear engaged than when one of the lower speeds is being employed, and we believe it to be quite general to coast with the direct drive in when using the motor as a brake, although instances are not wanting where the low gear is utilized, especially if the hill be particularly long and steep in order to afford as much assistance as possible to the running brakes.

RELYING UPON A MAGNETO ALONE.

Editor THE AUTOMOBILE:

[1,261.]—Can a good magneto alone be relied upon for ignition, without having a battery and coil for reserve? Is there any disadvantage in using leather treads studded with steel rivets? If it is a good thing and cuts tire expense in two, why don't practically all owners use them, especially as it reduces the liability of puncture? Is a cast iron exhaust valve head any better than a one-piece forging? Does a two-cylinder engine have any more than double the power of one cylinder? Some say it does and others say not.

Peru, Ind.

A great many foreign cars in use on the other side—thousands in fact—have no other form of ignition than a magneto. Tires, or treads, of this type consume considerably more power in driving the car than where plain treads are used, and we do not believe the life of the tire is as great when they are used, though they prevent punctures and similar unpleasantness. Whether a cast-iron exhaust valve head is better than a one-piece forging will depend upon the material employed in the forging. For a cheap form of construction the valve with cast-iron head gives satis-

factory service, as the material is heat-resisting to a high degree. One-piece forgings are frequently made of nickel-steel and other alloys having similar heat-resisting properties. A motor having two cylinders of the same dimensions, and operating at the same compression and speed, should give approximately double the power of a single-cylinder motor of the same characteristics, it being customary in figuring the horsepower of multicylinder motors to calculate that of one and multiply by the number of cylinders.

REGARDING PUMP SYSTEMS OF FUEL FEED.

Editor THE AUTOMOBILE:

[1,262.]—Have automobiles ever used a pump and distributor in place of a carbureter to supply fuel to the cylinder? I never heard of one doing so, and there must be some great disadvantages in the system or some makers would undoubtedly give it a trial. Some such simple variable stroke pump with distributor, as was outlined by Mr. Lougheed last summer in "Motor Age," would seem to be far simpler and more reliable than a carbureter. The fact that the most efficient engines in the world, the Antoinette and Diesel, employ this means proves that it can be used, and used satisfactorily, too. What are the objections to its use on automobiles?

EVANSTON.

We do not know of any such system ever having been used on an automobile motor, but the mere fact that no builder of cars has seen fit to give it a trial cannot be taken as evidence that it has any great inherent disadvantages. Automobile manufacturers are in business chiefly to build and sell automobiles, and in order to do this successfully, they must work along the lines of least resistance, which means giving the public what it wants. There does not appear to be any reason why such a system cannot be successfully applied to an automobile motor, but as long as fuel costs are not excessive and the carbureter is fairly efficient, the demand for improvement will not be keen. Auto buyers had their fill of investing in experiments in the early days, so that a car to sell nowadays must be along currently approved lines. Improvement is not the work of a day, but must come as the result of development and evolution, and they represent a tedious and expensive process that the average maker does not wish to bear the cost of.

USING OLD SHOES AS TIRE PRESERVATIVES.

Editor THE AUTOMOBILE:

[1,263.]—As a subscriber to your valuable magazine, I would like to take advantage of your columns open to those seeking information. Is it practicable to put an old shoe over the tire on a car and hold it in position by lacing it to the wheel? In my locality there is a great deal of rough stone on the roads, which is very destructive to tires. If an old shoe could be strapped over the tire proper, it would take up all the surface cuts, which now ruin my tires very rapidly. I am aware that the resiliency of the tire would be somewhat affected, but the saving in tire expense would compensate me for that. If practicable, what size shoe would best fit over a 28x3 tire? Also, would the slight increase in the circumference of the driving wheels materially affect the gearing?

Grantwood, N. J.

F. P. W.

At least one case has come to our attention where this has been done with very satisfactory results. The experience in question was outlined in a short article by A. D. Hard, M.D., a Minnesota doctor, and appeared in THE AUTOMOBILE during the first half of 1907. If we recollect aright, Dr. Hard's procedure was simply to take an older shoe that was no longer fit to serve as the sole outer covering of an inner tube, and by means of holes punched along its edges, lace it directly over the complete tire, this applying particularly to the rear wheels. According to his account, the resiliency of the tire was not affected to a very marked degree, and the saving was considerable. The increase in diameter would not have any appreciable effect on the gearing of the car. Discarded shoes of the same size were used.

ABOUT AUTO TIRE PUMPS AND COMPRESSED AIR.

Editor THE AUTOMOBILE:

[1,264.]—Is there any power pump manufactured and for sale which gives entire satisfaction by which you can pump your tires with the motor of an automobile? You advise a Spencer pump. Is it satisfactory? A short time ago I saw a statement in "The

"Automobile" telling of cleaning carpets with the motor of an automobile by a San Francisco concern. Can you give me any more information about it? If carpets can be cleaned by the compressed air of an automobile, it is one of the greatest boons to the home in this generation. If the required apparatus for this work is not manufactured and for sale, a splendid field is open to somebody. We have had our homes cleaned by compressed air, with fine results, by a cumbersome machine which made it very expensive.

Pasadena, Cal.

A. I. GAMMON.

There are a number of such pumps on the market and, so far as we know, most of them have proved satisfactory in service, though we cannot lay claim to having had personal experience with any of them. When it is a matter of inflating a five-inch rear tire to the required pressure when near the close of a long day's drive, a power pump is certainly a friend in need. The idea of house, or carpet-cleaning, with the aid of an automobile is not novel, as outfits of this kind have now been in steady service in New York City for three or four years past. A vacuum, instead of compressed air, is generally employed, and after arriving at the point where the work is to be done, the auto engine is used to drive the vacuum pump and various lines of hose are led to the rooms to be cleaned. The vacuum sucks the dirt into the pipes and deposits it in a tank of water on the car.

ROUTE FOR ACROSS NEW ENGLAND TRIP.

Editor THE AUTOMOBILE:

[1,265.]—Will you kindly answer in your next issue the following: I have a party who is intending to make a trip down through Maine from Stamford by way of Springfield, Mass. Can you or any of the other readers of this magazine give me the best route to take, and if I will have to register in States I pass through.

Stamford, Conn.

F. N. P.

The principal route would be along the shore line to New Haven, then up through Hartford to Springfield. From the latter point there are a number of routes, the best leading through Worcester, Northboro, Marlboro and Weston. From Boston, there is a still greater number of routes to choose from, the main line running through Lynn, Salem, Ipswich, Newburyport, Mass., Portsmouth, N. H., and Biddeford and Saco to Portland, Me. The directions beyond the latter city will depend entirely upon the destination of the trip. The entire route from Stamford to Portland, with the exception of comparatively few miles, has been rewritten for the 1908 edition of the "Official Automobile Blue Book," which is now in press, and will be ready by April 1. In addition, it gives complete detailed information concerning the roads, garages, hotels and State laws. Your Connecticut registration will be good for the trip.

ARE THERE ANY SUCCESSFUL AIR-COOLERS?

Editor THE AUTOMOBILE:

[1,266.]—Are there any thoroughly successful air-cooled motors built? If so, by whom? If not, is there a demand for an air-cooled motor that will do all that a water-cooled motor will?

Mt. Zion, Ind.

G. W. BROWN.

Your query savors of a rare lack of knowledge of what has been going on in the automobile world during the past five or six years. Have you never heard of the Franklin, Knox, Marmon, Corbin, or Frayer-Miller cars? The many hundreds, if not thousands, of these makes that are in daily use in all parts of the country would appear to be ample evidence of the fact that successful air-cooled motors are not a rarity by any means.

IRREGULAR FIRING OF ONE CYLINDER.

Editor THE AUTOMOBILE:

[1,267.]—I operate the two-cylinder Autocar—1907 Runabout—and for some time I have observed that by cutting out cylinder No. 2, by holding down the trembler when the motor was at good speed, the engine would almost or perhaps quite stop running. To give cylinder No. 1 the same speed requires much earlier spark and more throttle than does No. 2 for the same speed. The lack of harmony in velocity of the two cylinders, of course, results in loss of power, and perhaps may damage the power plant finally. The ignition does not seem at fault, as I can trade lines and coils without remedying the sluggish engine and without retarding the more

active one. The exhaust and inlet valves have been scrutinized and the compression is good. Have I loose connections at the piston end of crankshaft, or what must I look for next?

L. N. DAVIS, M.D.

Judging from the description you give of the trouble, we should put it down, either to the carburetor, or to the manifold, and probably it is more apt to be the latter. See if there is a leak in the manifold where it enters the first cylinder, or any other reason why that cylinder does not get the same amount, or the same quality of fuel as does No. 2, which runs satisfactorily. Irregular working of this nature is most often traceable to the fuel supply.

WANTED: AN IMITATION RADIATOR FRONT.

Editor THE AUTOMOBILE:

[1,268.]—Will you kindly let me know where I can buy an imitation front part of hood to represent a water-cooled machine? I am repairing an air-cooled hood and want the front piece to hide the motor and represent a water-cooled machine.

New York.

JOHN A. WESEY.

If you will look through our columns you will find the announcements of makers of such parts, or if this letter comes to their attention we will be pleased to forward any information they care to supply.

REGARDING VERTICAL AIR-COOLED MOTORS.

Editor THE AUTOMOBILE:

[1,269.]—Please tell me the name of a four-cylinder, vertical, air-cooled car that has a forced down draft pipe to each cylinder? Also please give me the name of some four-cylinder, vertical, air-cooled cars other than the Corbin.

PRESTON H. PERRY.

Rockdale, Tex.

This is the Frayer-Miller.

The Franklin, Knox, Aerocar, Cameron, Marmon, Logan. Probably there are others that we do not happen to call to mind at the moment.

DEVELOPMENT OF THE AUTOMOBILE.

Editor THE AUTOMOBILE:

[1,270.]—Could you give me the name of a book on the subject of "advance in automobile construction?" I would like to get a book that describes the old makes of machines and their inventors, as I have been asked to write on the subject.

Plymouth, Ind.

FRED. H. KUHN, JR.

Probably Homan's "Self-propelled Vehicles" will give you what you want in this connection.

INFORMATION ON FRICTION SUPPLIES WANTED.

Editor THE AUTOMOBILE:

[1,271.]—Will you please send me addresses of firms where I can obtain friction paper, strawboard, etc., suitable for fillers of friction wheels?

C. G. SCHLEGEL.

Kenesaw, Neb.

Will some advertiser or subscriber please come to the assistance of Mr. Schlegel by furnishing the information desired?

ANOTHER IDEAL "CAR OF THE FUTURE."

Editor THE AUTOMOBILE:

[1,272.]—Being a subscriber of your most valuable paper and interested in former articles appearing in the same on the subject of the "Car of the Future," would like to give my ideas along the same lines. Having been in the automobile business from almost the beginning, builder of one car in the earlier days, and also an old bicycle man, I thought my article would probably interest some of your readers, to a certain degree anyway. The specifications of my ideal or "car of the future" are as follows:

Axle.—(Rear.) Live, and of the full floating type. Annular bearings throughout; (front) I-beam section, ball bearing, steering knuckles, roller bearings in front wheels.

Frame.—Ashwood, selected, reinforced with steel radius rods, etc., nickel steel.

Springs.—Full elliptic, 40 inches long, clipped. Front and rear the same.

Wheels.—34-inch, selected, white hickory, artillery pattern.

Tires.—34 inches by 4 inches front and rear, on detachable rims.

Brakes.—Double-acting on transmission shaft, operated by foot pedal. Two double-acting, one on each rear hub, operated by hand lever.

Tank Capacity.—14 gallons gasoline; 1 gallon lubricating oil.
Tread.—56 inches.

Wheelbase.—100 inches.

Motor.—Two-cycle, four-cylinder, 3 3-4 by 3 3-4 inches, having only nine moving parts, four pistons, four connecting rods, one crankshaft.

Cooling.—Air, copper radiating flanges on cylinders, etc., flywheel suction fan in rear.

Lubrication.—Oiler, gear driven from crankshaft.

Carburetor.—Float feed, auxiliary air inlet, needle valve, adjustable from the seat.

Ignition.—Atwater-Kent system, with dry batteries.

Spark Plugs.—Glass base.

Control.—Spark and throttle levers on top of steering post; also foot accelerator.

Starter.—Cylinder primer located on dash, so as to start from the seat.

Transmission.—Selective sliding, three forward and reverse, ball bearing.

Clutch.—Expanding ring.

Drive.—Nickel steel shaft.

Muffler.—As nearly silent as consistent with back pressure.

Steering.—Wheel irreversible.

Lighter.—Electric lamp lighter to light gas lights from seat.

Body.—Aluminum, side entrance, running boards, divided front seats, seating five persons.

Hood.—Aluminum, circular shape, instantly removable.

Weight.—2,000 pounds, scale weight.

Equipment.—Two oil side lamps, 2 by 8 inches, short focus lens, mirror headlights, set on car even with top of hood or a little higher; good horn, with screen; good generator with swinging basket, or gas tank; cravenette top; folding glass front; full tool equipment, with jack; tires equipped with tire treads, made from chrome leather, thick and heavy, with nickel corrugated rivets in the tread, round headed rivets on the sides to protect tires from ruts; fastened on the tires with steel wire rings through loops in the side of the treads.

The above car should give excellent service on our American roads, with a minimum amount of expense. The vibration and road shocks should affect the engine and other vital parts so slightly that the repairs should be very light. This car would be very easy on the tires. The long, full elliptic springs will make it very easy riding. This car should be marketed at \$2,250, f.o.b. factory, and would afford a fair profit at that figure.

Corsicana, Tex.

CLARENCE THOMAS.

WILL THE TIRE EXPERTS PLEASE ANSWER?

Editor THE AUTOMOBILE:

[1,273.]—I have long been a close observer of the pneumatic tire problem, but this is the first time I have ever got up "in meetin'" to air my views. I am not going to bore you with any spring wheel or other fantastic and revolutionary cure-all for tire troubles on the pleasure automobile, as experience with the types in daily use, extending over several years, has convinced me beyond a doubt that there is only one tire, and that is the pneumatic. It is like gold—entirely in a class by itself, but just as we have "near-gold" and "like-gold," we have lots of "near" pneumatic tires, some of which look all right, but the majority of which are neither one thing nor the other, while all are merely more or less recent newcomers to the "just-as-good" class of substitutes.

However, what I would like to obtain some definite information on is the matter of the heating action of the pneumatic tire. It is a matter of common knowledge that running even a comparatively short distance at high speed generates a great amount of heat in a tire—so great that the bare hand cannot be borne on the shoe of the tire, even for a moment, and water thrown on the tires is partially converted into steam. A little consideration shows that there are several sources of this heat. Starting from the outside, these are: First, the friction between the shoe of the tire and the road, and probably this is much greater than is generally imagined; second, heat due to the side bending of the shoe and the working of its various plies, one upon another, this doubtless not being very great, as otherwise the tire would be apt to disintegrate very much sooner than experience shows to be the case; third, the friction between the inner tube and the fabric lining of the shoe, this doubtless also being a matter of minor importance, as if there were much relative movement between the two, the valve stem would soon be damaged; fourth, the continuous compression and expansion of the air in the tube, which is already under considerable pressure. If we have a five-inch tire inflated to 100 pounds to the square inch, this being the pressure to which it is subjected under the load of the car and passengers when standing, it must be evident that every blow which the tire receives in meeting obstructions, dropping into gullies and in otherwise overcoming obstacles, causes a reduction of its interior volume and a consequent rise in the pressure which is accompanied by the generation of heat. The causes of this super-compression, so to speak, follow one another with such

great rapidity when the car is running at high speed that the attendant expansion has but a slight cooling effect.

What I would like to find out is, whether the outside friction with the road, or this super-compression of the contained air, is responsible for the major portion of the heat generated in the tire, and if the latter be the chief cause, would it be of any benefit to interpose a heat-insulating substance between the inner tube and shoe, so as to confine the heat to the former? PNEUMATICS.

CRITICISES DR. HARD'S IDEA OF COASTING.

Editor THE AUTOMOBILE:

[1,274.]—Dr. Hard, in his letter No. 1,229, seems to have a very hard time to tell whether the motor is pulling his car or the car pulling the motor, and if he is going up hill it is a question with him if it is advisable to use the high speed to gain power or the low speed. Compression is also a doubtful quantity with him. I quote, "when an automobile weighing 2,000 pounds descends a 25 per cent. grade, it is propelled by the force of gravity equal to one-fourth of its weight, plus the propelling force of its motor. The retarding forces to be overcome are total friction, air resistance, and the resistances to be overcome before the motor car delivers power. If the motor is turned by force applied to the drive wheels, these resistances remain constant, just the same as if the explosions overcame them. The faster the drive wheels turn the motor, the greater will be the resistance to be overcome and the slower the car will move. We will get the greatest service by using high gear with the spark throttle closed. Therefore, to coast down hill using the motor as a retarder, we should have a convenient circuit breaker and use the speed gear that gives the required resistance for steep hills, and intermediate or low for hills of less grade."

After all, the study of medicine does not make a man a mechanic. If the M.D. was to apply his medical skill to his patients as his letter would indicate he does his mechanical skill to his machine, his would be a good place for an undertaker.

Minneapolis, Minn.

JESSE JENNINGS.

COMMENDING THE HAZLETON STEAMER.

Editor THE AUTOMOBILE:

[1,275.]—The letter by W. Hazleton on his steel-tired steamer was very interesting to me. We see little enough about steam automobiles in the papers these days, and this seems strange, because there are plenty of steam enthusiasts on deck, and the subject seems worthy of more attention.

The use of coal in an automobile has never, to my knowledge, been attempted, at least in a pleasure vehicle, and while this would result in economy it seems to me that this is not the place for coal. In regard to the evaporating capacity, Mr. Hazleton does not state whether this is based on evaporation alone from and at 212 degrees, or whether he means evaporating water as at the temperature fed to the boiler into steam, under the conditions which it leaves. If the latter, his boiler must have an efficiency of about 90 per cent., which would be very remarkable.

I think that Mr. Hazleton is mistaken in his statement that one pound of kerosene will evaporate 25 pounds of water. There is no question, however, but what the Hazleton type of boiler is very efficient and has great capacity.

GEO. F. WOOLSTON.

New York.

BEST ROUTE FROM SPRINGFIELD TO ALBANY.

Editor THE AUTOMOBILE:

[1,276.]—Answering inquiry No. 1,214 for best route from Springfield to Albany: Via Westfield, Huntington, over "Jacob's Ladder," which, by the way, is only play for a good car, through East Lee, leaving State road just beyond at fork, direct to Stockbridge. Continue through West Stockbridge, State Line, East Chatham, Old Chatham, Malden Bridge, Nassau, Schodack Center (slow down for Judge Van Ness), Albany, 92 miles. Have made nineteen trips on this route, and find it the best. The direct Pittsburg-Albany road will be torn up this summer.

C. S. RANSOM.

Albany, N. Y.

WHO CAN HELP OUT ON THIS?

Editor THE AUTOMOBILE:

[1,277.]—Last summer I drove a Ford runabout with which I repeatedly had the same trouble complained of by F. R. Zeigler in letter 1,217 of your issue of March 12, 1908. I note your reply to his query, but am very confident that in the case of the car to which I refer, the difficulty was not due to alteration of the needle adjustment by jolting or otherwise, while the car was running.

It may be that some others of your readers have had this same trouble and have succeeded in remedying it. If so, I trust one of them will be good enough to communicate with you on the subject.

New York City.

D.

INDIANA'S AUTOING WEEK IS IN SUCCESSFUL PROGRESS

INDIANAPOLIS, IND., March 25.—The second annual automobile show given by local dealers and manufacturers opened Monday. The largest automobile parade the city has ever seen took place to-day. The number of automobiles in line exceeded expectations, and a successful week is anticipated. There were four sections to the parade, which was headed by C. W. Newby, grand marshal, followed by Mayor Charles A. Bookwalter, members of the board of works, board of safety, the police automobiles and the Indianapolis military band riding on a big five-ton truck.

Following came one model each of the different cars handled by local dealers, each car bearing a card of uniform size with the name of the car, its price and the name and address of the dealer handling it in Indianapolis. The commercial vehicle section was a special feature, with trucks and delivery wagons ranging from a little Waltham-Orient to a big five-ton Pope-Waverly. Following this came scores of automobile owners, including individuals and clubs from all parts of Indiana.

Tuesday morning at 11 o'clock the hill-climbing contest was held at Michigan Hill, northeast of the city, and there were fifty contestants, including a special event for motor trucks and delivery wagons.

The obstacle race will be held Thursday afternoon on Capitol Avenue boulevard. The week closes with a dinner at the Grand Hotel Saturday night.

In order to carry out the events of the week successfully, the Indianapolis Automobile Trade Association was organized and incorporated last week, as a voluntary association, without capital stock. Frank Staley, of the H. T. Hearsey Vehicle Company, was elected president; A. E. Vinton, of the G & J Tire Company, vice-president; P. D. Stubbs, local representative of the American Motor Car Sales Company, and secretary of the Overland Automobile Company, secretary; Frank L. Moore, of the Fisher Automobile Company, treasurer, and B. W. Twyman, of the Gibson Automobile Company, Charles R. Newby, manager of the Capital Auto Company, R. H. Losey, of the Buck-Losey Company, D. B. Sullivan, of the D. B. Sullivan Auto Company, and Paul Smith, of the Indianapolis Motor Car Company, directors.

Each dealer will exhibit in his own garage during the week. Several automobile manufacturers from over the State have obtained space in different parts of the city in which to exhibit their cars, and the accessory dealers will show their goods in the hotels.

BOSTON'S SHOW STARTED BOOM IN LOCAL TRADE

BOSTON, March 23.—That the much talked about success of the Boston show and the heavy business reported was not all due to imaginations unduly excited by the predominating red in the show building decorations has been indicated since the show was closed, and the exhibitors have been in the quieter atmosphere of their salesrooms. Instead of the reaction which commonly follows show week, and which leads the exhibitors, after footing up their expenses, to say that a show is an interruption of business and costs as much as it comes to, the Boston dealers are enthusiastic over the results which were obtained, and they are producing bunches of signed contracts and long lists of people to be followed up, which they obtained during the week in Mechanics' Building. It is estimated that \$500,000 worth of cars were sold, but these actual sales are as nothing to the business that was started and which the dealers expect to close within the next few weeks.

Very conclusive evidence that the show started a boom in the local trade may be obtained at the automobile department of the State Highway Commission. The week previous to the

show only 314 automobiles were registered, show week the total was 438, while during the week following the show the registrations reached a total of approximately 600 cars. Motor cycle registrations also took a jump. This increase shows only a part of the effect of the show, for many of the cars that were purchased, probably the larger part, will not be delivered for several weeks. During show week, sixteen new dealers were registered, and the past week eight more have taken out certificates. Since the first of January, when the law required that all motor vehicles should be registered, the Highway Commission has issued about 6,900 certificates for automobiles, 300 for motor cycles and 275 for dealers. Only 346 new private operators' licenses have been issued, but it was unnecessary to take out new licenses of this sort as the old ones held over. There have been issued since the first of January 231 new chauffeurs' licenses, and 460 have been renewed. Up to the middle of the month, when the returns from the automobile department were last tabulated, the commission had taken in more than \$40,000 from this source.

NEW HAVEN'S SHOW PROVES SUCCESSFUL.

NEW HAVEN, CONN., March 25.—The largest automobile show ever held in this State was brought to a most successful close here to-night. The New Haven Automobile show opened a week ago last Wednesday night. Mayor Martin, of this city, President Fuller, of the Connecticut State Automobile Association, and Montague Roberts, who piloted the Thomas car the first leg of the New York-Paris race, were present. The exhibition was held in Music Hall, the largest auditorium in the city, which was beautifully decorated, the decorations including several novel electrical effects. Every auto dealer and agency in the entire city was represented at the show, there being a complete accessories exhibit in the basement of the building.

Aside from the big show, there was an annex exhibit of Maxwell and Stoddard-Dayton cars in a building only two doors from the main show.

The Yale Automobile Club successfully held its first annual banquet last Wednesday night at the University Club.

DELAWARE TO HAVE ROAD SIGN BOARDS.

WILMINGTON, DEL., March 23.—Recently it was announced that the Delaware Automobile Association had decided to have sign boards placed at the road intersections in New Castle county, and now comes the announcement that the work will be done by the county, at the suggestion of Road Engineer James Wilson, who will supervise the project. In order to work in harmony in its efforts to insure the enforcement of the automobile law, the executive committee of the Delaware association has had a conference with the police commissioners.

AUTOISTS ENDORSE GOOD ROADS ADVOCATE.

MILWAUKEE, WIS., March 23.—That the good roads question is liable to become a political issue in Wisconsin was demonstrated last week, when a number of Janesville autoists endorsed J. B. Brown for the State Senate. Brown will make good roads his whole platform, and, judging from reports from that place, he will have a walkover.

FARMAN ECLIPSES ALL FLYING RECORDS.

PARIS, March 21.—Before a large gathering at the parade grounds of Issy-les-Moulineaux, Henry Farman to-day successfully accomplished the greatest feat that has ever been achieved in aeronautics. He made a continuous circular flight of two and a half kilometers, or about two miles, in 3:21, which is at the rate of 38 miles an hour. At least half of this time he sailed directly into the teeth of a stiff breeze, and that the latter did not perceptibly diminish the machine's speed is considered Farman's greatest triumph. The machine was of the heavier-than-air type of his own invention, and rose from the ground like a bird, without the slightest hitch, then circling around under perfect control at a height of about 30 feet. The course followed measured a mile, but the distance actually covered was easily twice this, as the inventor caused the machine to make long swerves one way and the other to show under what perfect control it was.

Yesterday Farman made a flight of two kilometers at a greater height and is confident that, within a year, machines will be made capable of flying fully 12 miles without coming to the ground. He also predicts that the sport will never become general, as it is not only costly, and real flying is too hard to learn.

Following his record-breaking performance, Farman accepted an invitation from Leon De La Grange to enter his machine, with which the latter had been making successful short flights throughout the day. De la Grange sent the machine over the ground at the rate of 30 miles an hour and then went into the air, succeeding in making a short flight. This is the first time on record that two persons have been aloft in an aeroplane of the heavier-than-air type.

INTEREST ACTIVE IN BALLOON CUP RACE.

PARIS, March 21.—A. B. Lambert, secretary of the Aero Club of St. Louis, is here, his chief object being to awaken interest in the aeronautical contests to take place at St. Louis next Fall, when the club will distribute \$35,000 in prizes. He is also reported as stating that the St. Louis club is anxious to take over the International cup race again in the event that the German club is not able to make the necessary arrangements. The French club announces that there are so many desirous of representing France in this event that the choice of three contestants to go to Germany has had to be deferred. The club has recently received a concession of a large plot of ground at the Issy-les-Moulineaux parade and will shortly erect ten sheds for aeroplanes. The Spanish Aero Club has arranged an elaborate program for the season and will start it with a long-distance balloon flight, which will start from Barcelona on May 17. The prizes are 9,000, 4,000 and 1,500 pesetas for the first, second and third arrivals, respectively.

CORRECTING THE STEARNS' 1908 DESCRIPTION.

In publishing a detailed description of the Stearns car for 1908, which appeared in the March 19 issue of *THE AUTOMOBILE*, on pages 401 and 402, a half-tone illustration foreign to the car was inadvertently inserted on page 402, and captioned "Bronze to Steel Emergency Brake and Its Housing." As a matter of fact, this was a photographic view of the new Le Moon rear wheel clutch, designed to do away with the differential, and its appearance in connection with the Stearns car was entirely out of place.

L. E. FRENCH TO EDIT A. S. M. E. PUBLICATIONS.

The American Society of Mechanical Engineers is to be congratulated upon the acquisition of Lester E. French to head its editorial department. Mr. French has had a long technical and newspaper experience, having been for nine years past editor-in-chief of *Machinery*, besides having compiled numerous textbooks on technical subjects. So many improvements are planned in the society's editorial work that no progressive engineer can afford to miss its various publications.

THE AUTOMOBILE CALENDAR.**AMERICAN.****Shows and Meetings.**

Apr. 4-11.....—Pittsburgh, Pa., Duquesne Garden, Annual Show. Automobile Clubs of Pittsburgh. Thomas I. Cochran, manager.
Apr. 5-12.....—Montreal, Canada, Arena, Third Annual Automobile and Sportsman's Show. R. M. Jaffray, Mgr.
Apr. 6-8.....—Denver, Mammoth Rink, Annual Automobile Show. G. A. Wahlgreen, manager.
Apr. 16-18.....—Memphis, Tenn., Automobile Show, Memphis Automobile Dealers' Association. William Bruce, secretary.

Race Meets, Hill Climbs, Etc.

Apr. 6-10.....—New York City, Automobile Carnival, Illuminated Parade, Hill Climb, etc., New York Automobile Trade Association.
Apr. 24.....—Briarcliff Trophy Race, Westchester County, N. Y. Robert L. Morrell, chairman.
May 4-5.....—Harrisburg-Philadelphia and Return, 300-mile Endurance Run, Motor Club of Harrisburg.
May 15.....—Chicago, Algonquin Hill Climb, Chicago Motor Club.
May 16.....—Hartford, Conn., 200-mile Endurance Run, Automobile Club of Hartford.
May 30.....—Bridgeport, Conn., Sport Hill Climb, Bridgeport Automobile Club.
June 24-27.....—Chicago, 1,200-mile Reliability Run, Chicago Motor Club.
July 6-8.....—Buffalo, National Convention of the A. A. A., and Start of Fifth Annual A. A. A. Tour.
Sept. 14.....—Chicago, Annual Economy Run, Chicago Motor Club.

FOREIGN.**Shows.**

Mar. 26-April 4.—London, Olympia Industrial Vehicle and Motor Boat Show.
Mar. 28-April 6.—Paris, Alcazar d'Ete, Small Inventors' Exhibition.
May 17-31.....—Austria, Budapest Automobile Show.
May 17-June 2.—Moscow, Russia, International Automobile Exposition, Automobile Club of Moscow.
December.....—Paris, Eleventh Annual Salon de l'Automobile, Grand Palais, Automobile Club of France.

Race Meets, Hill Climbs, Etc.

April 1-13.....—Monaco Motor Boat Races and Motor Boat Exhibition, International Sporting Club of Monaco.
April 25-May 25—Industrial Vehicle Competition, Automobile Club of France.
May.....—Paris, Competition for Agricultural Automobiles, auspices of "L'Auto." (Date to be announced.)
May 7.....—Sicily, Palermo, Targa Florio Circuit, Voiturette Race, Automobile Club of Italy.
May 11-16.....—Ireland, Irish Reliability Trials.
May 1-31.....—Automobile Taxicab Competition, France, Automobile Club of France.
May 10.....—Sicily, Targa Florio, Automobile Club of Italy.
May 31.....—Russia, St. Petersburg to Moscow Race.
June 1-18.....—Reliability Trials for Pleasure Cars, Automobile Club of Great Britain.
June 14.....—Mount Cenis Hill Climb, for Voiturettes.
June 9-17.....—Touring Competition for the Prince Henry of Prussia Prize, Germany, Imperial Automobile Club of Germany.
June 15-19.....—Scotland, Scottish Reliability Trials.
July 6.....—Voiturette Grand Prix, Dieppe Circuit (Automobile Club of France).
July 7.....—Grand Prix of Automobile Club of France, Dieppe Circuit.
July 13-17.....—Ostend, Belgium, International Race Week, Automobile Club of Ostend.
July 20-30.....—Ardennes Circuit Races and Coupe de Liederkerke, Automobile Club of Belgium.
Aug.....—France, Coupe de la Presse, Automobile Club of France. (Exact date to be announced.)
Aug. 29-30.....—France, Mont Ventoux Hill Climb, Vauclusien Automobile Club.
Sept. 1-8.....—French Voiturette Contest, auspices of "L'Auto."
Sept. 6.....—Bologne, Italy, Florio Cup Race, Automobile Club of Bologne.
Oct. 11.....—Berlin, Germany, Gordon Bennett Balloon Race, Aeronautica Club of Berlin.

CALIFORNIANS PREPARING FOR AN ACTIVE AUTOING SEASON

SAN FRANCISCO, CAL., March 20.—For the first time in the history of automobiling on the Coast, an organization devoted to the sport has systematized a schedule of events and has issued a full program for the season, in advance. This is the Automobile Dealers' Association of California, and, judging from the ambitious sale on which it has outlined its program, there should be no dearth of interesting events. The dates and runs are as follows:

Monday, March 29, club run by members and their friends to the summit of Mt. Hamilton and return, leaving San Francisco on the 7 a. m. boat for Oakland, thence southward to San José, stopping at Smith's Creek for luncheon. Then the trip up the mountain and return to San José, going home on either side of the Bay.

Saturday, April 11, hill-climb in or near San Francisco. The cars will be classified as follows: Gasoline runabouts, \$1,500 and under, two passengers; touring cars, \$1,500 and under, four passengers; touring cars, \$2,000 and under, four passengers; runabouts, \$2,000 and under, two passengers; touring cars, \$2,500 and under, five passengers; runabouts, \$3,500 and under, five passengers; free-for-all, gasoline or steam, two or more passengers. The entry fee will be \$20, to be returned if the entrant starts.

Saturday and Sunday, May 30 and 31. Two-day endurance

run round the Bay. First day, by way of Mission road to Uncle Tom's Cabin, round Spring Valley water works' lakes, to Half-Moon Bay, to San Gregorio, La Honda, Redwood City, by way of the Summit to Mountain View, to Los Gatos by way of the Saratoga road, and to San José. Second day, to Mission San José, through Livermore, Concord and Walnut Creek, over the Fish Ranch grade to Berkeley and finish at Oakland.

Saturday, July 4. Two days' trip through Marin, Sonoma and Napa counties. This event may be postponed, should the Automobile Club of California plan one for the same time.

Sunday, and three days following, September 6, 7, 8 and 9. This stretch covers two holidays, Labor Day and Admission Day, and may be utilized for an extended endurance run to Los Angeles. Nelson's record for the distance of 520 miles is 18 hours 13 minutes, but 48 hours will be allowed for the run each way, with a day's rest at Los Angeles.

As a curtain raiser to the program the association, through its Runs and Tours Committee, will welcome the contestants in the New York-Paris run to the Golden Gate. A. B. Watson, chairman of the committee, will head a delegation that will go south as far as San José, and will assume the duties of piloting them to San Francisco, this task having been undertaken by the Santa Clara Automobile Club as far as San José. The local club is preparing to make a great deal of the event.

A. M. C. M. A. NAMES ITS COMMITTEES FOR 1908

COMMITTEES for 1908 were announced last week by Benjamin Briscoe, chairman of the committee of management of the American Motor Car Manufacturers' Association. There are few changes in the committees over last year. The show committee, which is always an active one, will again have H. O. Smith, president of the Premier Motor Manufacturing Company, as its chairman. Associated with him will be S. H. Mora, of the Mora Motor Car Company, and R. M. Owen, of the Reo Motor Car Company. The following are the committees in full:

Show.—H. O. Smith, Premier Motor Mfg. Co., chairman; S. H. Mora, Mora Motor Car Co.; R. M. Owen, Reo Motor Car Co.

Tours and Races.—W. C. Marmon, Nordyke & Marmon Co., chairman; H. O. Smith, Premier Motor Mfg. Co.; A. C. Newby, National Motor Vehicle Co.

Good Roads.—Chas. E. Lewis, Jackson Automobile Co., chairman; James Couzens, Ford Motor Co.; R. E. Olds, Reo Motor Car Co.; H. B. Krenning, Dorris Motor Car Co.

Legislation.—R. E. Olds, Reo Motor Car Co., chairman; C. G. Stoddard, Dayton Motor Car Co.; A. C. Newby, National Motor Vehicle Co.; R. A. Palmer, Motorcar Co.; R. E. Graham, Acme Motor Car Co.

Advertising and Publicity.—Barney F. Everitt, Wayne Automobile Co., chairman; Harry Fosdick, Moon Motor Car Co.; G. B. Louder-

back, Buckeye Mfg. Co.; Theo. P. Bailey, St. Louis Car Co.; Leon Myron Bradley, New York office; Charles E. Duryea, New York office.

Membership.—W. H. VanDervoort, Moline Automobile Co., chairman; Morris Grabowsky, Rapid Motor Vehicle Co.; R. E. Burroughs, Abendroth & Root Mfg. Co.

Finance.—James Couzens, Ford Motor Co., chairman; W. G. Morse, Atlas Motor Car Co.; J. B. Bartholomew, The Bartholomew Co.

Standardization and Technical.—John D. Maxwell, Maxwell-Briscoe Motor Co., chairman; Henry Ford, Ford Motor Co.; R. S. Crawford, Crawford Automobile Co.; L. P. Mooers, Moon Motor Car Co.; R. E. Olds, Reo Motor Car Co.

Freight and Transportation.—Harry Knox, Atlas Motor Car Co., chairman; H. W. Mack, Mack Bros. Motor Car Co.; R. Harry Croninger, Pennsylvania Auto-Motor Co.; J. N. Willys, Overland Auto Co.; G. D. Wilcox, Gearless Transmission Co.; C. C. Hanch, Nordyke & Marmon Co.

Tires.—G. V. Rogers, Mitchell Motor Car Co., chairman; James Couzens, Ford Motor Co.; Frank Briscoe, Brush Runabout Co.; O. Stevenson, York Motor Car Co.

Agencies.—W. H. VanDervoort, Moline Automobile Co., chairman; A. R. Welch, Welch Motor Car Co.; H. S. Leyman, DeLuxe Motor Car Co.; Frank L. Pierce, Gaeth Automobile Co.; H. B. Larzelere, Chadwick Engineering Works.

NEW JERSEY'S AUTO AGENTS BEGIN ATTACK ON POLITICIANS

NEWARK, N. J., March 23.—That no stone is to be left unturned to rout the politicians who have been making auto legislation to suit themselves is evident from the first move in the campaign undertaken by the New Jersey Automobile and Motor Club and the New Jersey Automobile Trade Association, who are acting in conjunction. To demonstrate to the public the value of the automobile industry to the State of New Jersey, the Trade Association is sending broadcast to manufacturers a request to state from what makers in Jersey they buy parts of various kinds. The circular letter is signed by Secretary Ellis and President Paddock, of the association, and outlines the reasons for this particular move. It is, in part, as follows:

"Our politicians are blind to the extent to which our State is benefited by the automobile and the great number of people who

depend on it for a livelihood, for the reason that they do not see a complete car made here, but the fact is that New Jersey, more than any other state, benefits by the automobile.

"1.—From the fact that almost every part entering into its construction is made by our factories, including forgings, castings, bearings, springs, tires, lamps, bodies, varnish, leather, paint, electrical appliances, wire, tools, jacks, machinery, wheels, axles, gas tanks, trunks, radiators, gears, etc.

"2.—The peculiar location of our State makes it most attractive for tourists, and great amounts of money are annually left with our hotels, summer resorts, garages and merchants generally, and the automobile has immeasurably benefitted the real estate business and brought more desirable residents to the State than anything except the railroads.

"We are going to fight and fight hard. We will make it a paramount political issue with us and will look to parties rather than to persons for results."

ADVANCE OF THE CARRIAGE-MAKERS' ART.

Ever since the time, three or four years ago, when the carriage-maker first awoke with a start to the possibilities of the automobile and its future, there has been a keen rivalry on the part of different makers to see who could bring forth the most artistic and completely furnished closed body. As a result, many closed cars have come to represent a standard of

taste and equipment far in advance of anything that had been thought possible in connection with body-building on the horse-drawn vehicle. A good example of this refinement of interior finish that forms one of the striking developments of the industry during the past few years, is represented by the accompanying photograph of a special four-passenger Franklin coupé.

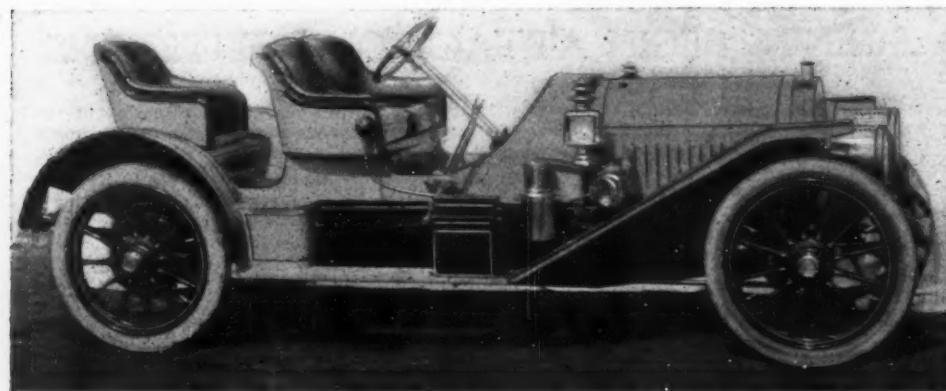
This is finished in striped buff, French

whipcord with lace to match, the broad lace around the door and front edge of the seats being designed especially to harmonize with the whipcord cloth. Quite a unique effect has been produced by lining the ceiling of the car, which carries a neat dome electric light, with the same pattern of cloth used on the remainder of the interior. The curtains are of light brown French silk and the carpet of French wilton, all harmonizing in the general buff color scheme, which is extended even to include the handles, these being made of brownish-yellow horn. The windows are all arranged to drop in pockets, and have frames of polished mahogany. The car is very roomy, and is said to be one of the best of its kind ever turned out by the Franklin Company, which has only turned its attention to the closed vehicle within the past two years.

NEW MODEL LOCOMOBILE ON VIEW.

One of the new models unveiled at the recent Boston show is the Locomobile roadster shown by the accompanying photograph. The chassis resembles the Locomobile, "Type 40," in most particulars, but the springs have been made lighter, owing to the reduced weight of the body employed, while the low seats give the car a lower appearance than it ordinarily has.

The designers have taken particular pains to secure a combination of style, conservatism and comfort, as it has been noticeable that many cars of this type are extremes,



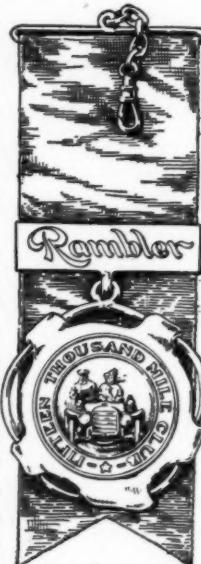
First Roadster Type of the Locomobile Turned Out from the Bridgeport Factory.

some even having the driver's seat almost over the rear axle, so that the seats are far from comfortable.

In this Locomobile "40 runabout" the seats are large and comfortable, and the seating capacity is variable, the two rear seats being placed on an artillery tool box. One of these seats may be removed, and the other placed on the center of the box, thus making it a three-seated car, or both of these seats may be removed. There is ample space between the box and the back of the front seats to carry a good-sized trunk or hamper, or the box itself may be removed, leaving the platform free. Some of these cars have already been placed, and the makers are planning for April deliveries.

STRIVING FOR RAMBLER CLUB PRESIDENCY.

KENOSHA, WIS., March 23.—Competition is keen for the presidency of the recently formed Rambler Fifteen Thousand Mile Club, every member of which must have covered at least 15,000 miles in a Rambler car. Major Edwin S. Muir, of the city of Winona, Minn., a formidable candidate for presidency, has a record of 20,000 miles from one Rambler car, 18,000 from another, and 6,000 from a third. Joseph I. Bennett, Boston, is a strong second with 19,000 miles from one car, the first 5,000 of which were traveled with an expenditure of but 85 cents for repairs. From the letters received from owners desiring membership in the club, it is shown that the average cost is a little more than two cents a mile, many owners having run forty to fifty thousand miles at a cost of less than \$200, exclusive of tires. Oil and gasoline averages one cent a mile, and repairs make up the remainder. Thomas B. Jeffery & Company offer a handsome watch fob as a membership token and as an incentive to owners to send in facts about the cost of keeping their cars. One hundred members are now enrolled in twenty-six different States. According to recent registration returns, 10 per cent. of the 2,211 automobiles in Nebraska are Ramblers; Illinois possesses 738 Ramblers out of a total of 9,799 cars, and Wisconsin claims 477 cars from the Thomas B. Jeffery factory among the 3,852 in daily use in that State.



ENTRY BLANKS READY FOR HARRISBURG RUN.

HARRISBURG, PA., March 23.—Rules for the second annual endurance run of the Motor Club of Harrisburg, to be held May 4-5, were issued to-day. This year's run will be over 300 miles in length, and will have the night control established at Philadelphia. On the first day, 168 miles will be traversed by the contestants via Lebanon, Reading, Allentown, Easton, Doylestown to Philadelphia. On the return trip, the mileage will be 145 miles, via Norristown, Reading, Lancaster, Columbia, Marietta, Mount Joy to Harrisburg.

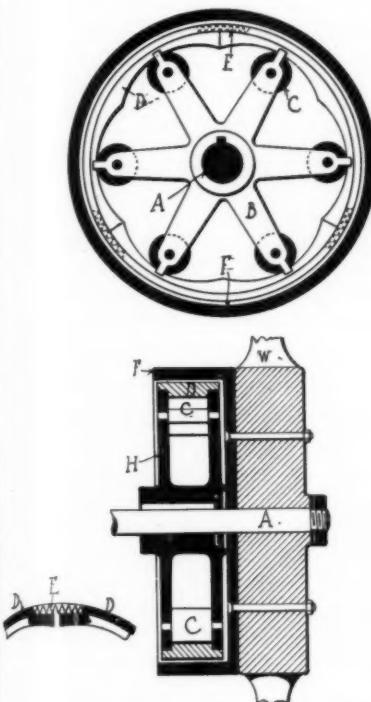
There will be four classes in the run, as follows: Class A, for touring cars costing \$2,250 and over; Class B, for touring cars costing less than \$2,250; Class C, for runabouts costing \$2,000 and over; Class D, for runabouts costing less than \$2,000. Handsome silver loving cups will be awarded as prizes in each class to the winning cars.

ELIMINATING THE DIFFERENTIAL.

Ever since automobiles have come into practical use, attempts have been made to do away with the balance gear, or differential, which has been found necessary to enable the car to take turns and to save the wear on the tire of the wheel which takes the inside of the curve. One of the latest of these is known as the Le Moon axle, the chief feature of which is that it transmits the

power through the slow-turning wheel alone when rounding a curve. It consists of a special form of automatic clutch applied to each rear wheel, one of these clutches being illustrated in elevation and section by the accompanying illustration.

These clutches consist of a spider *B* keyed to the driveshaft *A* of the axle. The end of each star piece carries a roller *C*, which bears upon an arc segment *C* of an expander *D*, which expander is forced outwards against the drum *F* on the rear wheel, thereby locking the axle *A* to the road wheel. The expander *D* is made in three sections, with springs *E* separating them, these springs serving to disengage when the clutch releases. The spoke of the wheel is designated *W*, and the wheel, loose on the driveshaft *A*, is only connected thereto when the expander *D* engages with the drum *F*. The driveshaft *A* extends from end to end of each axle and carries



Elevation and Sectional Views of Le Moon Clutch in Place.

a spider *B* on each end. Whether going straight or turning corners the axle and both spiders revolve at the same speed. When driving on the straightaway, the rollers *C* in their efforts to revolve, attempt to climb the curvature of the arc of the expander *D*, thereby expanding *D* and locking it to the wheel and rotating it. Should a corner have to be turned, the outer wheel is compelled to travel faster than the spider *B*, and so runs away, as it were, with the expander *D* until the rollers *C* are in the middle of the arc, at which point there is no engagement between the clutch *D* and the drum *F*, and then the inside wheel is carrying the car around the corner. When the corner is rounded and the road wheels run at the same speed, the clutch operates and the drive through both wheels is resumed. The claim that this device reduces skidding is based on the fact that the inner wheel drives when turning the corner.

According to the inventor, Mr. Le Moon, where a car starts turning to the left, if the outer wheel does the driving, its tendency is to keep moving in a straight line, irrespective of the turn made by the front wheels, and this tendency to drive in a straight course, results in the skidding. When the inner wheel drives, it also tends to follow the straight line or direction the car was following before the turn, but the direction of its effort is practically through the center of the car. Inventor Le Moon attaches great importance to this feature and claims remarkable freedom from slipping on cars equipped with his clutches. Dr. J. R. Pennington, 103 State street, Chicago, who is exploiting the merits of the invention, claims to have given some most satisfactory exhibitions of its work, and is confident that the Le Moon can be employed most satisfactorily as a substitute for the differential balance gear now universally employed. This would tend to both simplify and strengthen rear-axle construction to a very great extent.

PACKARD NEGOTIATING FOR E. V. CO. PLANT.

HARTFORD, CONN., March 23.—Though none of the terms of the deal are forthcoming, nor is it definitely settled that it will be consummated, it is known that the Packard Company is negotiating for the purchase of the Electric Vehicle Company's plant in this city. This much the officials representing the Packard interests, H. B. Joy and M. J. Budlong, are willing to admit. The hopelessly entangled condition of the defunct company's affairs is given as the reason for the delay that is bound to ensue before it will be announced definitely whether the plant will be taken over or not. In the meantime, it is currently reported that the purchase has practically been completed and that the only thing remaining is to settle the details.

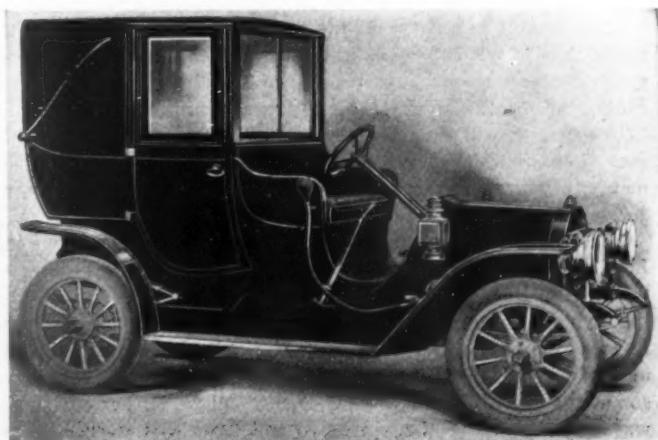
It is rumored that M. J. Budlong, formerly president of the Electric Vehicle Company, will take charge of the Hartford works when they pass under Packard control, and that the plant will be used for the manufacture of commercial cars and taxicabs. What will become of the Selden patent, and whether it is included in the sale as an asset, is a matter for much speculation. It still has four years to run and, should it be upheld by the courts, its value will be tremendous.

TWO STUDEBAKERS FOR THE A. A. A. TOUR.

It has been formally announced by C. F. Reddin, of the Studebaker Bros. Company, New York City, that at least two Studebaker cars will be entered in the A. A. A. Glidden tour. "The consensus of opinion," says Mr. Reddin, "seems to favor an endurance test of some kind, and the Glidden tour is, perhaps, the most satisfactory solution of the problem. Unquestionably, some of the faults which developed in the rules of the 1906-07 tours will, from experience, be eliminated in the tour of the coming season. Whatever the rules are, it is now my intention to enter at least two of our cars, and I feel certain that they will make as good a showing as they have in every contest in which we have entered."

AMERICAN TAXICABS BECOMING NUMEROUS.

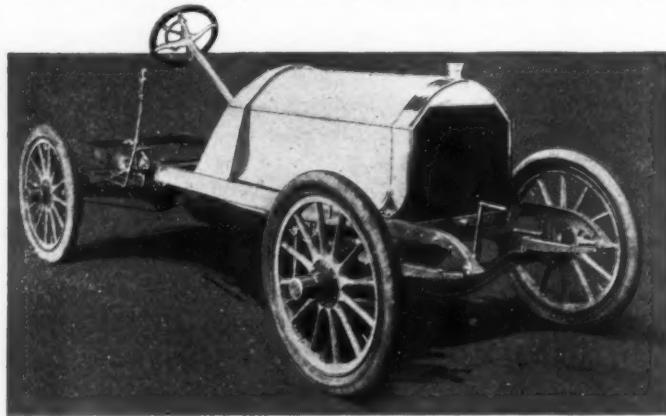
Interest in the solution of the cab problem on the part of American manufacturers is growing apace to judge from the number of new cars designed for this service that are making their appearance on the market. The latest of these to be brought out is the Oakland, of which a photograph is shown here. It is being produced by the Oakland Motor Car Company, of Pontiac, Mich., and is the work of Alanson B. Brush. It is the first of its kind to be placed on the market at such a low price, as it lists at \$1,850 in complete running order, as shown. It is of extremely light, yet stanch, construction and has been designed particularly with a view to economical running and maintenance; in other words, as a dividend-earner.



Attractive Lines of the New Oakland Taxicab.

HOWARD NOW MARKETS ASSEMBLED CAR.

Since adopting its plan of selling the complete parts for six-cylinder and four-cylinder cars, which was described in these columns some time ago, the Howard Motor Works, Yonkers, N. Y., find that there are a great many prospective purchasers who doubt whether the assemblage of parts thus supplied "will go together or not." They have accordingly decided to modify their plan of marketing these materials to the extent of giving



Complete Assembly of Howard Six-cylinder Parts.

the purchaser the option of taking the car in pieces, or completely assembled and ready for the body as shown in the accompanying illustration, which shows one of the six-cylinder type. These cars are equipped with the well-known Howard four- and six-cylinder, four-cycle, vertical, water-cooled motors, which are designed and constructed according to the best engineering standards. They are equipped throughout with the best grade of accessories, such as the Hill Precision oiler, and have numerous special features of construction, such as the Delahaye type of slip joint on both the water piping and inlet manifold.

The clutch is of the conical type, with cork inserts and the change speed gear provides three forward speeds and reverse on the selective plan of operation, the clutch and gear being inter-connected by means of an ingenious and positive interlocking device which prevents the shifting of the gears until the clutch is disengaged. Final drive is by propeller shaft to a live rear axle. The six-cylinder car is geared 2.5 to 1 on the high speed, while the four-cylinder car is geared 3 to 1. The complete parts of the six-cylinder car, including tires, list at \$1,200, or \$1,500 assembled as shown, while two-seated bodies may be had from \$100 upward. The touring car lists at \$1,100 and \$1,400 respectively and will accommodate a five-passenger touring body.

HUNTING ANTELOPE IN AN AUTOMOBILE.

"Although it is some time ago now, doubtless the story of the antelope hunt which I made in my car last fall will be of considerable interest to you," writes M. L. Woodman, of Lewistown, Mont., to the National Motor Vehicle Company, Indianapolis. "However, I will confine myself to a bare statement of the facts," continues Mr. Woodman, "leaving all literary embellishments to yourselves, that being, if my information is correct, an accomplishment with which every Indianian is gifted.

"Accompanied by an expert chauffeur, Johnny Warner, we left Lewistown, where I reside, about 8 o'clock in the morning of October 10 last, and set out in my National for the foothills of the Belt Mountains, located in Meagher County, Montana. Lying about twenty miles northwest of Harlowtown and sixty-five miles from this city is a spring where I was sure we could find some antelope. The roads were superb and we let her out on the way over, covering the sixty-five miles without even a pause and making the distance in an even two hours. Upon arriving at the spring we drove around for a few minutes until, with the aid of a powerful field glass, I located a bunch of about twenty-

five antelope lying down at a distance of about five miles.

"We headed the machine in that direction and succeeded in getting within one mile of the antelope before they jumped up, ready for the race. The country is of a rolling nature that has been close-cropped by thousands of sheep, so that we could make out all holes and stones some distance ahead. The antelope broke into a run when we were within about three-quarters of a mile of them. We started after them at a moderate pace to get some idea of their speed, gradually creeping up. After following half a mile or so in the rear for a short time, we let the machine out and the way we began to close the gap made it appear as if the animals were standing still. After running about two miles we came within fifty feet of them. Going at a 35-mile an hour rate, I brought down one of them and then took the wheel while Warner handled the gun and brought down another.

"We dressed the antelope, loaded them on the car and started for home, arriving back in Lewistown in the afternoon, having traveled fully 150 miles in the short time we were out. This was my first hunt for big game in an automobile, but it is my intention to repeat the experience next year, having fully convinced myself that my National can easily outrun even an antelope, which is one of the fleetest animals to be found on the plains."

IMPROVED WHEELS FOR PORTABLE TANKS.

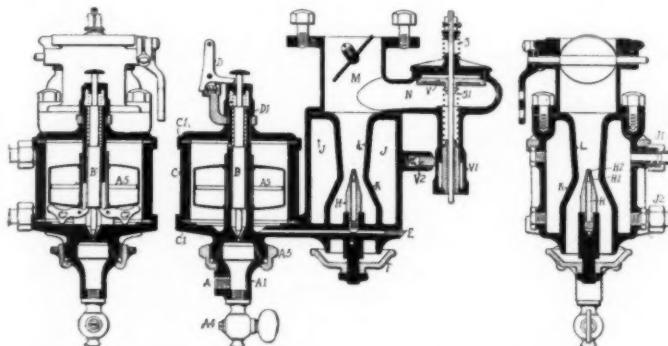
Wire wheels not having proved satisfactory on their special portable gasoline tanks, owing to their continually catching on projecting parts of the cars, and wood wheels not being practical, S. F. Bowser & Company, Fort Wayne, Ind., have adopted the indestructible steel wheels made by the Indestructible Steel Wheel Company, 1304 Michigan Boulevard, Chicago. These wheels are very light for their size and are extremely strong. As is the case with the pleasure type for automobile use, the steel stampings are perforated, as will be noted on reference to the accompanying illustration of a Bowser portable tank equipped in this manner. The makers of the indestructible wheel are now perfecting a type for motorcycle use, which will be placed on the market in the near future, as these wheels are especially adapted for service calling for extreme strength and a minimum weight.



Bowser Garage Tank with Indestructible Steel Wheels.

IMPROVING CARBURETER AIR REGULATION.

Doubtless the question of automatically altering the amount of air supplied to the mixture provided by a carbureter has been by far the most puzzling that the maker of a carbureter has had to contend with. Certain it is that it has been the subject of a greater number of inventions and patents than probably all the other parts of the carbureter put together. One of the most



Sectional Views of the New Goldberg Carbureter.

recent attempts to solve the problem and one that has met with unusual success, is the Goldberg carbureter, made by the Goldberg Motor Car Devices Manufacturing Company, 1253 Michigan avenue, Chicago. It is the result of more than two years' close study of the subject on the part of its inventor, although it has now been on the market but half a year.

The chief features of its design will be apparent from the accompanying sectional illustration, which shows it to be of the float type, the gasoline entering from below at the point *A*, this being a universal type of coupling permitting the end *A*¹ to be turned in any direction. Departing from the usual practice of making the interior of the float chamber a closed book, it has been made of Macbeth glass 1-4 inch thick, which is claimed to be practically unbreakable. This glass chamber rests on combination rubber and cork washers *C*¹, so that by screwing the cover down tightly on its central support it is made perfectly gasoline tight. The needle valve *B* is purposely made of heavy and durable construction. It is operated by the two triangular-shaped levers *C*², formed with toe-pieces resting against a shoulder on the valve and the high heel parts on which the drawn brass float *A*², rests. The valve *B*, is held on its seat by the spring *D*¹.

Another feature in which the Goldberg carbureter differs is in the nozzle, which is not provided with any means of adjustment, but has openings of three different diameters, the largest, *H*, being near the top, while one of medium diameter is a short distance above it, this being shown at *H*¹, and the smallest, *H*², is in the tip of the nozzle. The exterior of the cone, *H*, bears a definite relation to the conical sides of the chamber *K*, which is such as to produce a strong current of air at low speeds, the auxiliary air inlet meanwhile remaining closed. The gasoline level is 5-16 inch below the top of the cone, or approximately at the bottom of the smallest opening. The mixing chamber is water-jacketed and an unusually large amount of water used, as is indicated by the size of the spaces *J*, thus insuring against condensation even in the coldest weather, while should this occur higher up, as at *M*, the liquid will fall back into the heated zone. The thimble, *F*, at the base of the chamber, regulates the size of the normal air opening, and when starting any overflow from *H* falls into *F* and is there vaporized on the principle of the surface carbureter.

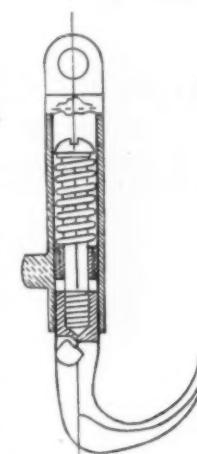
The spring-controlled auxiliary air-valve, *V*, takes care of this essential, which is controlled by a high-speed spring, *S*, and a low-speed spring, *S*¹, the latter giving an opening of 1-64 to 1-32 inch, while the former permits the maximum opening of the valve, one coming into action as the other stops, *S*¹ acting alone on the low speed, the relative tension of these springs hav-

ing been carefully worked out. The Goldberg is made in 1, 1-1-4 and 1-1-2-inch sizes, the various parts being exactly proportioned in each case, so that a carbureter of this make when purchased for a motor of a certain size may be said to be accurately adaptable to it, as if designed expressly with its needs in mind, and with the present demands for greater economy and efficiency this is what is required in every instance.

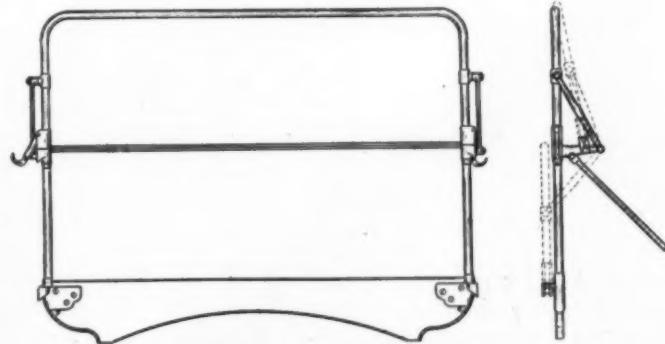
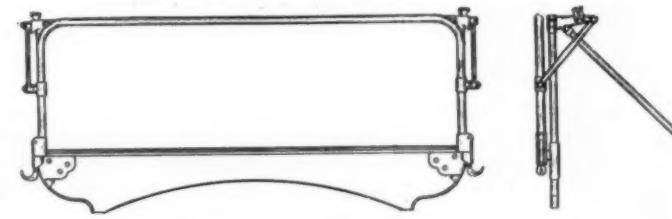
SIMPLIFYING THE GLASS WINDSHIELD.

One of the most important developments in the design of that essential that few drivers care to be without for any length of time—the windshield—has been the elimination of the array of bolts, nuts and fasteners which had to be manipulated every time an adjustment was necessary. This was a distinguishing feature of the early types of glass windshields, and the culmination of its development toward the other extreme, that of simplicity, is to be found in the new Williams divided windshield, now being placed on the market by the Twentieth Century Motor Car Company, South Bend, Ind. It is so constructed that the top sash can be placed in any one of three positions without touching a nut, thumbscrew or bolt. The operation is accomplished with the aid of a simple locking device, the design of which will be clear at a glance at the accompanying illustration, showing it in longitudinal section.

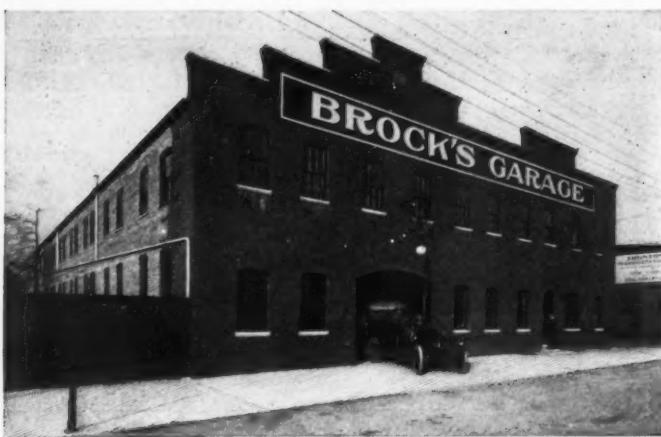
One of these locking devices is placed at each side of the frame, and by taking hold of them and pulling down and outward, the sash may be moved to any position desired. The forward position leaves a space through which the driver can see the road very plainly, but still serves as a protection against rain and snow, while in summer it acts as a dust and bug shield though giving ample ventilation. The design and construction of the brass frame type of shield made by this firm is shown in the larger illustration. These fittings are machined throughout, all parts being made on jigs and templates, thus making them all interchangeable. On both the brass and the mahogany frames they are assembled with "anti-rattlers," which prevent them from becoming noisy. The wood frames are made in two styles, for touring cars and runabouts. On the brass frame there is not a nut or bolt to hinder cleaning, which will be found a great advantage.



Automatic Hook of Williams Shield.



Showing the Williams Divided Windshield, Open and Closed.



Showing the Extent of Trenton's (N. J.) Big Garage.

THINGS DOING AMONG THE GARAGES.

System Essential in Automobile Garage Business.

ROCHESTER, N. Y., March 23.—As many an experimenter has learned to his cost, the automobile garage business, by reason of its many ramifications, is one in which it is easy to lose money. A reliable system of bookkeeping and consistency in carrying it through are in every case essential to success. The United States Automobile Company, of this city, has evolved a system which appears to keep a very close check on all departments and to preclude possibility of waste of time or material.

As far as customers are concerned the charges are the usual ones for live and dead storage. The internal working embodies the use of a time clock for all arrivals and departures of men, cars, liveries, etc. The same system applies to the workshop, where every man must account for each half-hour of his time, besides reporting to the garage foreman if he is employed in the shop. Such general terms as "cleaning up," "shop work," etc., are unknown. For all accessories delivered a signed receipt is demanded, thus obviating any later claim that goods were not delivered. In connection with this is the usual system of receiving goods through a receiving clerk.

Just what it costs each day to run the garage is shown by a special daily form, giving the exact amount paid in and paid out in connection with the establishment. The bookkeeping system comprises about twenty-five different headings, with a debit and credit account for each, thus keeping an absolutely correct distribution of payments and earnings in all the different departments into which a garage business can be divided.

New Jersey's Capital Has a Fine New Garage.

TRENTON, N. J., March 23.—Quite a notable addition to this city's garage facilities—in fact to that of the State of New Jersey—was made last fall in the shape of the new Brock garage, located on Canal street, just off East State street and near the Pennsylvania railroad freight depot. Its owner is John L. Brock, who has had a number of years' experience in the business, and who planned the building throughout with a view to handling the largest number of cars without confusion. The building is of brick construction, two stories high, and measures 80 feet front by 154 feet in depth. The first floor is devoted to storage, making it easy to run cars in and out of the garage at short notice. An independent locker is provided on this floor for each one of the cars stored there. Access to the second floor is by means of an electric elevator which conveys cars to the repair shop and electrical department. Both of the latter are of the most modern type throughout, the repair shop being completely equipped with the latest improved machinery, all of which is motor driven, while the electrical department affords facilities for the charging of a number of cars simultaneously and has a storage capacity for 60 cars. A

special reception room is provided for women, and every provision has been made both for the ready handling of the car, as well as the comfort of the drivers. The establishment represents an outlay of \$25,000 and is reputed to be one of the largest and best equipped of its kind in the State. Mr. Brock is the Trenton representative of several well-known cars, and also carries a full line of accessories. He is a member of the contracting firm of Prior & Brock.

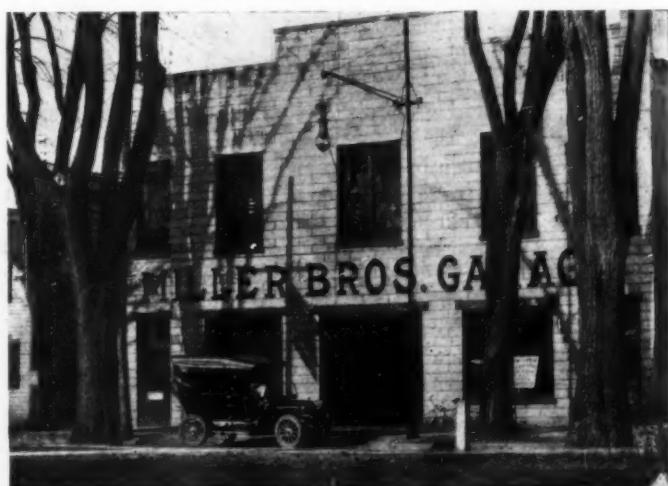
An Imposing New York Up-State Garage.

GLENS FALLS, N. Y., March 23.—Nothing is so strongly indicative of the permanent nature of the automobile business in the smaller cities of upper New York State as the imposing character of the buildings that are being put up within the last year or two for garage purposes, as well as the amount of money that has been spent on facilities for the comfort of the automobile owners who look to these establishments for the storage of their cars, as well as their supplies.

The Miller Brothers Garage, located at 12 Maple street, in this city, forms a typical example of this, and some idea of the size of the establishment may be gained from the accompanying reproduction from a photograph. The building is two stories in height, of fireproof construction throughout, and with its wide front and ample depth affords storage and washing facilities for a large number of cars. The building is devoted exclusively to garage purposes, the office of the proprietors being situated at 7 Bay street. As Glens Falls is located right at the entrance to the Adirondacks and lies between Saratoga and Lake George, the number of tourists that pass through it daily during the season is unusually large, and the demand for garage accommodation and facilities is correspondingly large. This accounts, to a certain extent, for the size of the Miller Brothers' establishment, though there are quite a number of cars of various makes owned by local residents in the city and suburbs.

Delaware City's Garage Facilities Growing.

WILMINGTON, DEL., March 23.—The T. C. Bradford Company, which conducts a large automobile, motorboat, bicycle and general sporting goods establishment at 711 Market street, will shortly undertake the establishment of an up-to-date automobile garage which will represent a welcome addition to the city's facilities in this respect. The large Tangy stable property, located at Tenth and Tatnall streets, has already been leased for ten years and the work of remodeling the former dwelling place of the equine motor into a modern automobile garage will shortly be undertaken. Every modern facility will be installed and the establishment will be a model of its kind when completed. The lessees will take possession this week.



The Garage that Glens Falls, N. Y., is Proud of.

FORT GEORGE HILL-CLIMB TO BE FROM STANDING START

FOR the first time in the history of events of its class in this country, the Fort George hill-climb, New York City, which will be run off on Thursday, April 9, as one of the features of the auto carnival to be given under the auspices of the New York Automobile Trade Association, will be made from a standing start. This is done for two reasons, probably the chief of which is the danger of a flying start, owing to the obstructions in the shape of the pillars of the elevated structure at that point, and on which one of the contestants came to grief last Summer. It is also a much more severe test of a motor's power and will not be a great disadvantage, as a short run will be available before taking the grade. No alterations on stock cars will be permitted, other than that of gears and the removal of mufflers, tops and windshields.

Since first issuing the program of this event, the hill-climb committee of the association has revised the classification of the different entrants so that they now stand as given below, the chief changes being the addition of two open classes in which steam and gasoline cars may compete together, beside special classes for steam and electric cars. The list of events will be:

- 1.—Gasoline cars selling for \$850, or less.
- 2.—Gasoline cars selling from \$851 to, and including, \$1,250.
- 3.—Gasoline cars selling from \$1,251 to, and including, \$2,000.
- 4.—Gasoline cars selling from \$2,001 to, and including, \$3,000.
- 5.—Steam, gasoline or electric cars selling from \$2,001 to \$3,000.
- 6.—Gasoline cars selling from \$3,000 to, and including, \$4,000.
- 7.—Four-cylinder cars selling for more than \$4,000.
- 8.—Six-cylinder cars selling for more than \$4,000.
- 9.—Free-for-all, open to cars of all motive powers.
- 10.—Open to steam cars only.
- 11.—Open to electrics of all types.

Entry fee for each car for each event, \$10.

Early entries for the carnival parade, to be held on the evening of Tuesday, April 7, include 50 Oldsmobiles, 25 Maxwells, 6 Stearns and 6 Studebakers, the other entries already bringing the total over 200, although the blanks have only been out a short time. Several entries of floats have already been made for the dealers' division, prominent among them being one of Jones speedometers and one of P. & H. tires.

The search for the oldest car still in use has brought forth a two-cylinder, six-horsepower Panhard imported in 1898. It will be driven by George Robertson and will be given the post of honor, unless something antedating it should be unearthed in the interim. It has been decided to start the parade at 7:30 in the evening from Broadway and Fifty-seventh street, the route being as already given in *THE AUTOMOBILE*. The reviewing stand will probably be located on Broadway at or near Eighty-sixth street.

THIRD ANNUAL HILL-CLIMB AT BRIDGEPORT.

BRIDGEPORT, CONN., March 23.—Preparations are well begun for the third annual hill-climb of the Bridgeport Automobile Club, at Sport Hill, Easton, on the morning of May 30. Chairman Ralph M. Sperry, of the contest committee, has obtained permission from the selectmen of Easton to use the road on the hill on the morning of Memorial Day, and during the present week a meeting of the committee will be held and the classes arranged. A. H. Crawford, of New York, who won the Yale cup last year, has expressed his intention of offering a special prize cup. A. L. Riker, of the A. A. A. racing board, has been asked to officiate as referee.

QUAKER CITY M. C. ROADABILITY CONTEST.

PHILADELPHIA, March 23.—On Saturday, April 11, the Quaker City Motor Club will run off the second event of its season's program—a "roadability" contest from Philadelphia to Cape May. The winner will have to be an excellent judge of pace, for drivers will have absolutely nothing to go on except the speedometer. The chief emblem, the handsome \$500 silver Hotel Cape May cup, will go to the car that most nearly approaches the official schedule time figured out for the course by the officials.

Time allowances will be secret, each driver carrying a sealed envelope, which will not be opened until the finish is reached, when the start and finish times will be compared and the relative positions of the contestants figured out. Second and third cars will be awarded certificates of merit, while the drivers will receive medals. The event will be open both to club members and outsiders, the latter "coming up double" on the entrance fee.

POWELL EVANS HEADS A. C. OF PHILADELPHIA.

PHILADELPHIA, March 23.—Powell Evans has been elected president of the Automobile Club of Philadelphia, to serve during the year 1908-09. The other officers elected are: Vice-president, Stedman Bent, and S. Boyer Davis, secretary and counsel. The new board of governors will be made up of Stedman Bent, S. Boyer Davis, George B. Linnard and Isaac Starr, who will serve for one year, and Henry P. Baily, Powell Evans and Jacob J. Seeds, whose terms will expire in March, 1910.

A. C. A. ESTABLISHES SUPPLY DEPARTMENT.

With a view to affording its members reduced prices, the Automobile Club of America has added a supply department, located on the third floor of the clubhouse, and will handle a complete line of tires and accessories.

NEW YORK MAY HAVE F. A. M. NATIONAL MEET.

In response to a call sent out by Henry Wehman, secretary of the Federation of American Motorcyclists, there was an enthusiastic gathering at the Grand Union Hotel on Monday evening last. The outcome of the meeting was the formation of the Federation of American Motorcyclists 1908 Meet Club, which was organized for the purpose of conducting the next annual meet. Toledo, O., was an applicant for the event, and the only one outside of New York. As the sentiment in favor of holding the affair here is very strong, there seems to be little doubt that New York will be decided upon. The dates are to be fixed by mail, and will not be announced for a fortnight or more.

The officers of the newly organized club are: President, R. G. Betts; vice-president, L. H. Gutermann; secretary, Henry J. Wehman; treasurer, David Dessau. Both President Betts and Secretary Wehman hold the same relative positions in the national governing body.

PROVIDENCE COMPANY GETS TAXICAB ORDER.

It has been known for some time that the William H. Seach Company, of New York, which has the cab privileges of the Waldorf, Holland House and the Park Avenue hotels, was in the market for taxicab equipment to take care of these stands, and it has been rumored from time to time that the order for them had been placed with various companies. It is now known definitely that an initial order for 100 cars has been placed with the American Locomotive Automobile Company, Providence, R. I. Two of the latter company's make have been plying in New York streets experimentally for several months past, and they won out against the entire field of both foreign and domestic types. No details are forthcoming as to the design of this smaller brother of the American Locomotive auto, but it is presumed that it will be found a most representative type of its class.

BRIEF ITEMS OF NEWS AND TRADE MISCELLANY

The West-Stillman Motor Car Company, Philadelphia, agents for the Pennsylvania and Mercedes, have secured the agency for the Atlas car in the same territory.

Charles A. Bebber, Jr., formerly a partner in the North Side Vulcanizing Company, has just branched out for himself, establishing headquarters at 331 Michigan avenue, Chicago, where he will carry on a general tire repair business, dealing in all makes of tires and accessories.

Dating from March 16, the firm of Robert Bosch, New York, Inc., has been changed to the Bosch Magneto Company, in order to more clearly identify the name of the company's products in the public mind. The change is wholly one of title, and is merely for the reason indicated.

Pirelli & Company, the Italian tire manufacturers, who have an American branch house at 296 Broadway, New York, have just issued a revised price list on their tires, which went into effect on March 15. This concern is the oldest manufacturer of rubber goods in Italy, and has a most complete equipment of modern machinery for tire making.

Louis Strang's work on the Isotta-Fraschini at Savannah, on Thursday last, was a Michelin victory as well, for which Strang was awarded \$200 in cash, as his car was equipped with the Michelin compressed tread tires. This is the second victory for Michelin, as Bernin's Renault, which made a world's record at Ormond, was similarly equipped.

Memphis (Tenn.) automobile dealers have just formed a trade association, under the title of the Memphis Automobile Dealers' Association, of which Jerome P. Parker is president, and William Bruce, secretary. Arrangements have been completed for an automobile show, to be held on April 16, 17 and 18, next, the building having 30,000 square feet of floor space.

One of "Pal's" latest industrial works of art is the Continental Caoutchouc Company's poster advertising the Continental "Rouge Ferre" tires. It consists of a female figure surmounting one of the tires of the type in question, and as it is executed in brilliant colors, the effect is striking and unique. It is looked upon as one of the best specimens of this artist's poster work.

The Palmer & Singer Manufacturing Company, New York City, has just received its first consignment of Selden cars. The new car is a 30-horsepower, five-passenger touring type, and is universally considered one of the best of its kind ever offered at such a low selling price, namely, \$2,000. It follows standard engineering practise throughout, and is very well built, bearing no resemblance to the "original" Selden.

The Hartford Suspension Company has just been granted an injunction against the Motor Car Equipment Company, New York, agents of the Hercules Auto Specialty Manufacturing Company, of Los Angeles, Cal., restraining them from making or selling the Hercules shock absorber, which the Hartford company claims is an infringement of the well-known Hartford-Truffault device, covered by patents.

When it comes to original and attractive forms of advertising literature, Colo-

nel Sprague, of umbrella fame, who has made Norwalk, O., one of the best known cities in the country, ranks with the top-liners. His latest takes the form of a pair of calendars that will be honored with a place on the wall after their value as such has departed. They are entitled a "Bold Bluff" and "A Waterloo," and show groups of dogs playing poker, and are handsomely lithographed.

The rumor that the Winton company would market an eight-cylinder car next season is untrue. The success of the Six-Ten-Six has justified Mr. Winton's enthusiasm as to sixes, which to his mind, are infinitely superior not only to fours, but also to eights. The racing car, *Bullet No. 2*, had eight cylinders, and although this car was highly successful, Mr. Winton asserts, it is not to be compared for an instant with the Six-Ten-Six.

Motor car shipments for the second week in March amounting to more than twice as much as the shipments for the first week of the month are reported by the H. H. Franklin Mfg. Co., of Syracuse, N. Y. Twenty carloads of automobiles were sent out during the week to points widely distributed throughout the country. Orders were well in advance of those for the preceding week. The Los Angeles dealer wired in for two carloads, and urgent orders for carload shipments were received from other Pacific Coast points.

"We have already received orders for 500 more cars than our agency contracts call for," says R. E. Olds, of the Reo Motor Car Company, Lansing, Mich., "despite the fact that the majority of these contracts were made as early as last September, when there was no suspicion of a financial slump. Confronted with these conditions, we have been compelled to increase our facilities for the production of 1908 models of the Reo cars, although we now have 1,100 men who have been working all winter, the Reo plant having been worked to its full capacity right through."

The Chicago Motor Car Company, which sells Packards in Chicago, figures out the question, "What becomes of all the automobiles that have been used for several seasons," thusly: These figures show that of 100 per cent. of the Chicago owners of 1908 cars, 91 per cent. of the owners of 1907 cars, 82 per cent. of the owners of 1906 cars, 80 per cent. of the owners of 1905 cars, and 50 per cent. of the owners of 1904 Packard cars, still drive their original cars. For a period of five years, 95 per cent. of all purchasers of Packards are still driving them, 87 per cent. retaining their originally purchased cars, and 8 per cent. having purchased later models of the Packard. Of the remaining 5 per cent. 2 1-2 per cent. are now driving other makes, while 2 1-2 per cent. have none.

English automobile papers have been devoting a great deal of space and attention to the recently concluded "standardization" test which was carried out with the aid of three single-cylinder Cadillac cars. The conditions were that these cars be totally dismantled, their parts being placed in three heaps. The Royal Automobile Club's technical committee then intermingled the parts promiscuously, and from the lot it was the duty of the Cadillac mechanics to reassemble three complete machines. This was done at the

garage of the Anglo-American Motor Car Company, London, agents for the Cadillac in England. After being reassembled, the cars underwent a long and strenuous test on the Brooklands race track, proving in a striking manner the accuracy of American methods of multiple production as exemplified by a car of which thousands have been turned out.

At the recent Buffalo show, the local Aetna Insurance Company agents, Knoll & Turgeon, who make quite a specialty of automobile insurance, had engaged a very prominent space, when they were confronted with the regulations that "no signs, and no advertising placards would be allowed." They were in a quandary as to how to "get their money's worth," as they had no mechanical devices to exhibit, but the difficulty was solved by mounting on a small box a toy circular saw and a toy trip hammer, operated by belts made of elastic bands, the power being supplied by a small motor. The sharp, insistent and rapid tap-tap-tap of the hammer drew the crowd, and the onlooker's gaze passing to the mechanical toys rested on a neat placard behind them, reading "We will keep right on hammering and sawing wood until we get your automobile, accident and health, and liability business," which effectively told the story.

NEW AGENCIES ESTABLISHED.

The Continental Caoutchouc Company, makers of the Continental tires, have taken on a new representative in Buffalo, N. Y., their distributing agents in that territory from now on being the Centaur Motor Company, 59 Franklin street.

The Ranger-Barrett Auto Company, Minneapolis, Minn., has taken the agency for the Glide line of cars for that city and St. Paul. This arrangement was concluded during the recent visit of R. A. Whitney, general sales manager of the Bartholomew Company to that city.

On April 1, the White Company will open a large branch house in Pittsburgh, having secured the building at 138-148 Beatty street, formerly occupied by the Liberty Auto Company. W. B. Yoder will be in charge. This is the eighth White branch, and it will cover Western Pennsylvania.

R. E. Graham, of the Acme Motor Car Company, Reading, Pa., is making an extended trip through the West visiting the company's different agencies. In Chicago arrangements have been made with Webb Jay & Co., to handle the Acme line. Mr. Jay intends to enter the Acme in all events in the West to which the car is eligible.

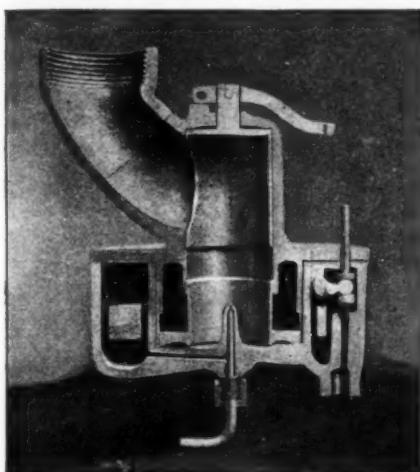
PERSONAL TRADE MENTION.

Edward B. Lausier has resigned as sales manager of the motor department of the American & British Mfg. Co., Bridgeport, Conn., to accept an important position with the Timken Roller Bearing Axle Company, of Canton, O.

John C. Spiers, formerly factory manager of the Autocar Company, Ardmore, Pa., has just gone with the Standard Roller Bearing Company, Philadelphia, and will take full charge of the latter concern's manufacturing department.

INFORMATION FOR AUTO USERS

Duplex Carbureter.—No matter how superior the design and workmanship of a motor, or the material used in its construction, the service rendered will not be very great unless it is equipped with a satisfactory form of carbureting device. The converse is true, in that many a very ordinary engine could be vastly improved



SECTION OF THE DUPLEX CARBURETER.

by putting a good carbureter on it. The Duplex Roller Bushing Company, Belfast, Me., in their extended experience in building motor boats, some of them very fast, have had an excellent opportunity to study the problem of carburetion, and in the "Duplex," are confident that they have evolved something which fills the bill. Simplicity and reliability have been the chief aims, and following them out has resulted in a carbureter without springs or auxiliary valves. It is of the concentric float type, and has but one adjustment and one throttle, as will be seen by the accompanying sectional view illustrating the Duplex carbureter in its entirety. No provision has been made for priming, as it has been found to be totally unnecessary with this new type.

Quick-Acting Grease Gun.—Miller & Starr, 250 Green street, Brooklyn, N. Y., are placing on the market a special type of grease filler known as the Miller "Quick-Acting" grease gun, designed for replenishing the change-speed gears and shaft bearings on automobiles and motor boats. The Miller grease gun is made of the best bronze and consists of a barrel with a nozzle at one end and a cap at the other, the plunger having its shank extended through the cap, the shank itself being provided with spiral grooves. Spiral lugs in



MILLER & STARR'S QUICK-ACTING GREASE-GUN.

the cap engage these grooves to reciprocate the plunger as the shank is rotated. The plunger is advanced rapidly and with a uniform movement by turning the handle shown, only four revolutions being necessary, so that the makers claim that this gun will empty a charge of eight ounces of grease in three seconds. It can be as quickly recharged by unscrewing the cap,

and its construction obviates the tedious process of unscrewing the plunger. The lubricant can also be ejected in exactly the quantity desired by turning the handle. Moreover, it will not spill nor lose its contents through the jolting of the car.

Salisbury Wheels.—In the mind of the autoist, "wheels is wheels," and provided they do their duty uncomplainingly there is probably no one part of the car that receives so little attention as the wheels. But that there are wheels and wheels is amply evident from the catalogue of the Salisbury Wheel & Manufacturing Company, Jamestown, N. Y. The hub is the vital part of any wheel, and as it is strong or weak, the wheel itself must be likewise.



DETAILS OF THE SALISBURY WHEEL AND HUB.

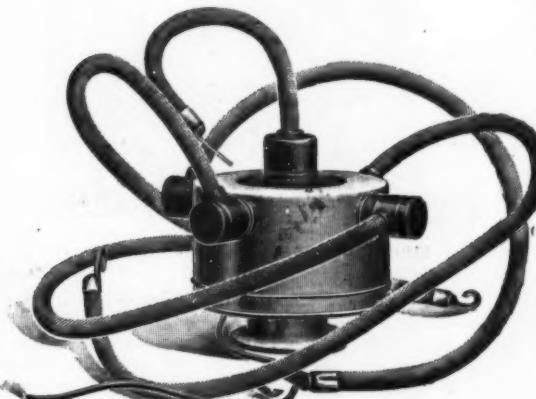
It is on this account that the makers of the Salisbury wheels dwell particularly on their patent Improved Artillery hub. This is made in two parts of malleable material, the inside flanges of each half being ribbed as shown. These ribs serve to stiffen the flanges, prevent torsion, keep the bolts from shearing off, and maintain the spokes in the proper alignment, from which it will be apparent that their advantages are more numerous than would appear at first sight. This company makes wheels of this type in all sizes, from those designed for the lightest runabout up to the heaviest car, turning out special sizes and patterns to order.

Flentje Shock Absorber.—This is a new device of the hydraulic type, employing glycerine as the operating fluid, and on which patents have been applied for. As will be apparent from the illustration, it is of extremely simple design and construction, consisting of a piston and cylinder, the latter adapted to be attached to the axle of the car by means of a special bracket, while the former is made fast to the frame. The best grades of steel and phosphor bronze are used in its construction, all parts being heavily coppered and nickel-plated. The piston is pierced with six ports, allowing the glycerine to pass freely on the downward stroke, but partly closing automatically, thus checking the rebound by only permitting the fluid to pass slowly. It is being manufactured and marketed by Ernst Flentje, 1643 Cambridge street, Cambridge, Mass.



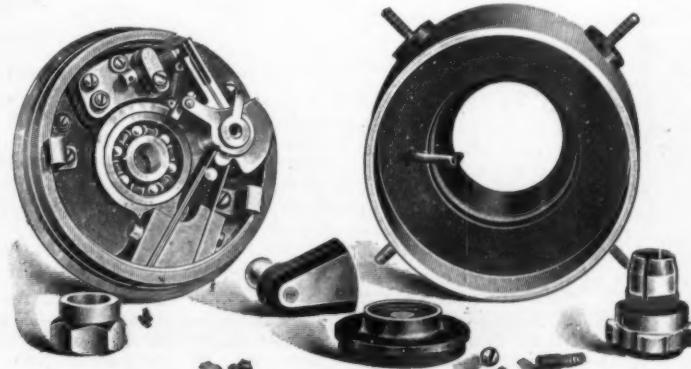
FLENTJE GLYCERINE SHOCK ABSORBER.

Pittsfield Acme Igniter.—This is a new combined contact maker, timer and distributor just brought out by the Pittsfield Spark Coil Company, Dalton, Mass., in response to the demand for greater economy and reliability in ignition systems us-



EXTERIOR VIEW OF NEW ACME IGNITER.

ing batteries, and particularly dry cells, as the source of current. It is, in short, a synchronous timing system in itself, as with the addition of a single vibrating coil it is adaptable to a motor having any number of cylinders. Its increased economy



SHOWING THE PITTSFIELD SPARK COIL COMPANY'S NEW ACME IGNITER.

is due to the fact that contact is made mechanically, so that it is always positive, regardless of the speed of the motor or the condition of the batteries, while it also eliminates the possibility of having the contacts "freeze" together. The contacts are insured long life as the circuit make and break is provided with a magnetic "blow-out," which prevents arcing and keeps the single large platinum contact cool. As will be evident from the accompanying illustration showing the Pittsfield Acme Igniter dismantled, it consists of but a few simple parts, and as its only moving member runs on an annular ball bearing, its life is practically indefinite. No changes are required to adapt it to the average car, as it is designed to be attached to the half-time shaft usually provided for the ordinary ignition timer.

Emergency "Mud Hooks."—This is a novel and ingenious device which has just been brought out by the Garage Equipment Company, Milwaukee, Wis., and is being placed on the market in the East by the Post & Lester Company, Hartford, Conn. It is intended for emergency use on occasions which occur so frequently on American roads—that of being hub-deep in mud, snow or sand. The makers guarantee



SHOWING THE EMERGENCY "MUD-HOOK."

one set of them to be sufficient to enable the car to pull itself out of bad places in which any one of these obnoxious materials happens to be the retarding element, and once the car is out they can be removed again. As the makers say, "The farmer will charge the price of two sets to pull you out of one hole." For long stretches of mud or deep sand two or three sets can be used to advantage. They are made of malleable iron, weighing 5 pounds per pair and can be applied to any tire from $3\frac{1}{2}$ to $5\frac{1}{2}$ inches. They are supplied either with or without straps.

Invincible Schacht.—One of the handy buggyabout type of cars that has forged quickly to the front is the Invincible Schacht, made by the Schacht Manufacturing Company, Cincinnati, O. It was one of the first of its kind to be seen at the Boston Show recently, and attracted far more attention than did many of the high-powered and high-priced cars, as the down-Easters had heard a great deal of it, but had never seen this truly middle Western type of automobile. It is distinguished by numerous features of design and construction, employing no gears or clutches. A friction type of transmission is used, the flywheel disc of the engine being brought into contact with the driving wheel on the main countershaft by means of a pedal. Any speed from one to thirty miles an

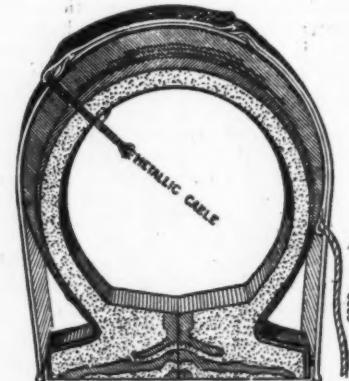
hour can be attained by shifting the hand lever at the side of the body, and this can be operated at any time, regardless of the speed that the car happens to be traveling at. The long Concord springs and high-cushion tired wheels of second-growth hickory were familiar sights to the New Englanders, but they had never seen them



THE "INVINCIBLE" SCHACHT RUNABOUT.

combined with an automobile power-plant before. It is equipped throughout with roller-bearings, and its general appearance is quite a pleasing contrast to that of many of the high-wheelers. Its makers have been building automobiles for a number of years, so that it represents the culmination of a long experience in this line. Many agencies have been placed in different parts of the country this Spring.

Improved Tire Casings.—Unprotected casings, though they may never be called upon to do any work, deteriorate so rapidly that it is rare for an automobilist to carry them on his car without some cover. From the earliest types, in which the tire was protected by a rough canvas cover secured by buttons, various improvements have been made, until now pneumatic tires are as carefully gloved as a lady's hand. One of the latest types of casing, patents for which have been issued to H. R. Teele, is marketed by Hopewell Brothers, Cambridge, Mass. Instead of the buttons or laces usually employed, the duck or leather

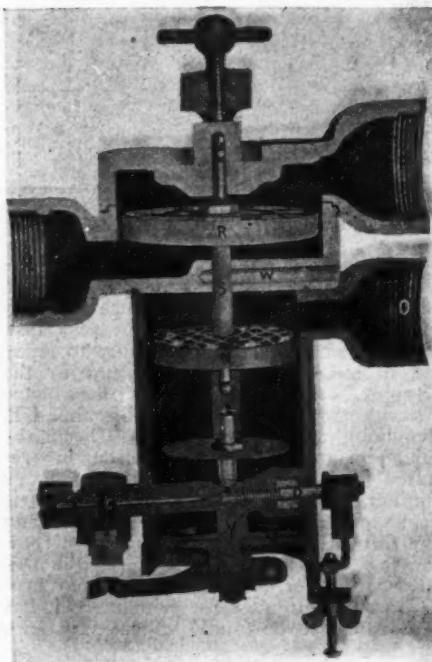


SECTIONAL VIEW OF THE TEELE COVER.

casing is attached by means of a metallic casing at one end and a cord at the other. As will be seen from the sectional view, the inner diameter of the tire case does not pass over the outside diameter of the tire; consequently the inner portion of the tire case makes a perfect fit to the tire, avoiding the customary wrinkled appearance.

The Scientific Carbureter.—This is a new type of carbureter that is the invention of E. W. Stevens, East New Market, Md., and is the result of three years'

constant study of the problem of carburetion, supplemented by exhaustive experiments. The "Scientific" carbureter is not of the float feed type, as will be evident from the accompanying sectional view of Model A, designed for two-cycle motors. Probably a description of its method of operation will suffice to make matters clearer than merely describing its construction. The fuel enters at *A* and is strained by *C*, then passing the needle valve *D*. The plate *J* is pierced by four triangular openings coinciding with ports, and is moved by *K* to open them more or less as needed. The valve *D* is threaded into the piece *Y*, and at its outer end carries a pinion meshing with a rack carried by *J*, so that moving the latter causes *D* to open more or less as the throttle is moved, so that the amount of fuel used is always in proportion to the air admitted. The draught through the mixing chamber causes the wheel *N* to revolve at



DETAILS OF THE "SCIENTIFIC" CARBURETER.

high speed, thus increasing the suction on the opening of the inlet valve of the motor, causing the valve *L* to lift and admit a predetermined amount of fuel which is thoroughly mixed with the air by the revolving wheel and being blown against the hot plate of the member *Q*, and issuing at *O*. The exhaust from the engine enters at *P*, sets the wheel *R* spinning, and as the latter retains its momentum it greatly increases the scavenging of the engine. The "Scientific" carbureter is being manufactured in both two and four-cycle types by the E. W. Stevens Company, East New Market, Md.

Brampton Auto Chains.—Charles E. Miller, 97-101 Reade street, New York City, has just received a large shipment of the well-known Brampton English chains and is now in a position to supply all calls for both American and foreign standard sizes. Mr. Miller has been importing these chains for a number of years, during which time the demand for them has increased to a very great extent, as they are their own best advertisement.

THE AUTOMOBILE

WEEKLY

NEW YORK—THURSDAY, MARCH 26, 1908—CHICAGO

10 CENTS

WINTON



LESS THAN A QUART
FOR 242 MILES.

Report of an Automobile
Club of America lecture
in the New York Times:

"President Colgate Hoyt said that the members had all been deeply interested in the economical results of the 242-mile run through Long Island last week, and had been agreeably surprised at the fact that one six-cylinder car used less lubricating oil for the entire run than any other machine, requiring less than a quart."

That "one six-cylinder" was a
WINTON SIX-TEEN-SIX.

The Winton Motor Carriage Co.

Member A. L. A. M.

CLEVELAND, OHIO, U. S. A.

Every Six-Teen-Six owner
should enter his driver in
our \$2500 contest. Ask
us about it.

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New York
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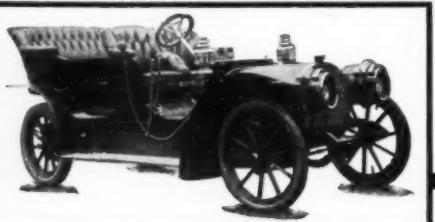
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Maja Map of Westchester County now ready. The most practical ever produced. Maja Briarcliff Trophy card with map, how to reach the course, and full particulars free on application. If you write for it please send postage.



With New York-Paris Contestants



Mora
MECHANICALLY RIGHT

Built for Strenuous Reliability

The car since its return from New York Show has been stored at the factory where it proved of interest to visitors, and before starting on this last trip had its running gear overhauled, without interfering with bonnet seals. No repair parts were carried. **SEALED BONNET BOOKLET ON REQUEST.**

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Broadway & 52d St., New York City 18 Mora Place, Newark, N.Y.



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SPECIAL NOTICES

Advertisements inserted under this heading at so cents per line; about 7 words make a line. Remittance should accompany copy. Replies forwarded, if postage is furnished.

Cars for Sale

A BARGAIN—\$2,500.00; late '07 Stearns 60 horsepower; Bosch magneto and other '08 equipment, complete with top; owner wishes to sell so as to purchase 90-horsepower Six Stearns. Address The F. B. Stearns Co., Cleveland, O.

A LWAYS ON HAND, from 25 to 50 automobiles needing slight repairs; good investment for mechanic or experimental purposes; send for list. Manhattan Storage Co., 334 West 44th st., New York.

A NUMBER of used standard makes of cars that, considering their excellent condition, are bargains at prices asked. Send for list. It will pay you. C. P. Warner, Packard Bldg., 1615 Michigan Ave., Chicago, Ill.

A UTOMOBILE BARGAINS—We can save you from one hundred to five hundred dollars on a slightly used or second-hand automobile. Our assortment is the largest and our prices the lowest. Complete list mailed free. The Starin Company, 1094-1100 Man St., at St. Paul St., Buffalo, N. Y.

B UICK, 2-cylinder, 5-passenger, 1907 model, with top, slightly used, all in absolutely good condition. Wish to purchase larger car. Cotton & Gorham, Fayetteville, N. C.

B UICK, new; never used, 1907, Model F, \$900; Buick, 1907, Model F, run 1,100 miles, about as good as new, \$800; Oldsmobile, touring car, single cylinder, good condition, \$300; Logan 2-cylinder touring car, good condition, \$200. Address "Cars," care The Automobile.

C ORBIN—The following cars have just been taken in trade for 1908 models; write at once for further particulars and prices: 1907 Corbin touring car, thoroughly overhauled and repainted, to all intents and purposes practically a new car; 1907 Corbin runabout, pearl gray, with black upholstery, in perfect running order and just refinished; 1906 Corbin touring car, in good running order, excellent appearance. Above cars will be sold with the same guarantee as a new car. The Corbin Motor Vehicle Corporation, of New Britain, Conn.

D ELIVERY CAR—Cadillac; new; has not been run; lists at \$1,000; will sell for \$700 to quick buyer. Also good 4-cylinder touring car; 30-h.p.; for \$500. Horace Sague & Son, Poughkeepsie, N. Y.

F OR SALE at a low price for cash, modern 4-cylinder touring car; newly painted Prest-O-Lite tank, tires good shape, speed 55 miles an hour; would take smaller car or runabout as part payment. R. M. Cornwell, Syracuse, N. Y.

F ORD—Model K, 6-cylinder; just refinished; A-1 condition; price \$1,500. Holley Bros. Co., Detroit, Mich.

G ET WISE—We have anything you want in second-hand cars—Packards, Winton, Locomobiles, White Steamers, Franklins, Buicks, Oldsmobiles—and bargains at that. The Std Black Automobile Co., 630 Walnut St., Cincinnati, Ohio.

G REAT ARROW CAR—1906 Model, 45-h.p., thoroughly overhauled and refinished; fully guaranteed; will take smaller Pierce car as part payment; write us for equipment and price. The George N. Pierce Co., Buffalo, N. Y.

H AYNES—16-h.p., convertible tonneau, opposed engine, shaft drive. C. H. Turner, Henderson, N. C.

H ERSE'S A BARGAIN for \$400—Last year's 18-h.p. Lambert light touring car; has not been run 2,000 miles; has gas headlights; tires in A-1 condition; paint could not be told from new. Address Quick, box 28, care The Automobile.

L OCOMOBILE STEAM RUNABOUT—Needs slight repair on boiler; otherwise complete; \$145.00; 10-horsepower motor, nearly new, \$75.00. R. C. Lemons, Wolf Creek, Monroe county, W. Va.

L OZIER—1906; with top and usual accessories; guaranteed in perfect condition; price \$2,000. Address "S. Jr." care The Automobile.

M ANHATTAN STORAGE COMPANY, 334 West 44th st., New York City, have for quick sale the following cars. These prices are fixed by the owners, who are anxious to sell. We get only a 5 per cent. commission for acting as salesmen. Call or write for further information.

Locomobile, 30 to 35 h.p., 4-cylinder, Rushmore Searchlights, cost \$4,000, will sacrifice for \$1,000. Lambert 4-cylinder, friction drive, for \$450; cost \$1,800. Must sacrifice 4-cylinder, 24-h.p. Panhard, good running order; makes fine appearance; cost \$6,500; yours for \$1,500. Must sell Pope Hartford touring car; cape top; good tires; fully equipped; fine condition; originally cost \$3,000; \$1,000 cash will take it. Mobile wagonette; needs light repairs; excellent for hotel or hacking purposes; must sell this week; \$250. Must sell at once 4-cylinder National touring car; cost \$3,200; will take \$850. Must sell Pierce-Arrow Stanhope, tires good, all running order; cost \$1,200; a snap for some one at \$390. \$1,600 buys Lozier 40-h.p. touring car; originally cost \$4,500. \$225 buys Columbia runabout; good batteries, top; fine condition; ready for use. \$375 buys Knox runabout, 12-h.p.; full equipment; excellent condition; cost \$1,000. \$425 will buy \$3,500 Winton, 24-h.p. touring car; large tonneau; canopy top; extra shoe; complete set lamps, horn, tools. Stevens-Duryea touring car; must be sold quick; cost, \$3,200; will take \$850.

M ARMON CARS—Glidden Tour perfect score models; overhauled, repainted at the factory; an opportunity to secure a high-grade, reliable car at a bargain. Address "Three-Point Suspension," care of The Automobile.

M ATHESON—One 1906 model, 40-45 horsepower; seats eight; complete in every detail; original cost, \$6,000.00; make your best offer. E. H. Labadie, Galveston, Texas.

O LDS RUNABOUT—Ready for the road; very cheap, or will trade for good motorcycle. Lock box D, Flemingsburg, Ky.

O NE 2-cylinder runabout, at bargain price if taken at once; one Pierce Stanhope, with top and lamps; in good condition; new tires. Hilts & Kennedy, Batavia, N. Y.

O NE 12-passenger Reo "bus," at a bargain. Capital Auto Co., 130 East New York St., Indianapolis, Ind.

R AMBLER RUNABOUT—1907 Model 27; guaranteed not run over 300 miles; like new; a rare bargain. Address "27," care The Automobile.

R UNABOUT—Wayne; two-cylinder; fine condition; run only about 3,000 miles; will sell to quick buyer for \$400. The Bristol Automobile Co., Waterbury, Conn.

S PECIALLY BUILT 50-h.p. Frayer-Miller touring car, fitted with cooking apparatus and tentage for long tours independent of hotels if desired. Used only three months; guaranteed perfect condition; all 1908 features; write for photograph and full specifications. R. D. Palmer, Mt. Vernon & Grant, Columbus, O.

S TEAM AUTOMOBILES—Write for bargain list. F. W. Ofeldt & Sons, Nyack, N. Y.

S TEVENS-DURYEA—Four cylinder, 1906 model, fully equipped, including lights, top, etc., and many accessories not usually found on a second-hand car; in first-class condition; will be sold cheap for cash. One four-cylinder Grout, model 1907, with Rutenber motor, including top, lights and complete equipment, and a bargain. The above to be sold cheap for cash, as we are desirous of moving same before the season begins. One four-cylinder Grout, 35 horsepower Rutenber motor, bought in October, 1905; top, lights, extra shoe, inner tubes, extra chains, skidding chain, Witherbee battery, etc. Address "L. D. T." 74 Main street, Brattleboro, Vt.

T HE WEEKLY BARGAIN COUNTER—Under this heading each week will be found a few "snaps" of Manhattan's Pioneer Automobile Establishment. Our prices are always the lowest for the best thoroughly overhauled cars in New York. We cheerfully demonstrate. 1906 and 1907 Pierce Arrows, all like new, very low; 1906 to 1907 Packards, Peerless, Popes, Olds, Thomas and 100 more. Write for catalogue. Broadway Mammoth Automobile Exchange, 245 West 56th st., New York City.

W HITE STEAMERS—Two, in guaranteed perfect condition; must be sold to close an estate. Address "Estate," care The Automobile.

W INTON—Model M; in first-class condition, with full equipment of top, folding glass front, speedometer, headlights, Prest-O-Lite gas tank, Rushmore searchlight, extra tire and carrier, tools, etc.; body dark green, top black; has been run about 3,000 miles, driven entirely by owner, and is in perfect order; cost, as equipped, \$4,000 in June, 1907; will sell for \$2,500, cash or approved security; owner's reason for selling, has purchased six-cylinder car, same make. Address "L," care Glen Springs Garage, Watkins, N. Y.

2-CYCLE ELMORE (2-cylinder), in fine condition, painted and varnished last season; tires in fine shape; car has new black top with enamel bows; new Witherbee battery and fine searchlight; cash price, \$600. B. W. Fenn, Rochester, N. Y.

12-PASSENGER sight-seeing car or bus; used two months; cost \$2,800; will sell for \$800. Write for cut and description. Lock Box 611, Meyersdale, Pa.

\$98 AND UP—Runabouts and light touring cars; standard makes. C. T. Paxson, 1200 Niagara St., Buffalo, N. Y.

1906 MODEL G FRANKLIN Touring Car; in A1 condition; painted dark blue; \$675.00 cash takes it. J. D. Lippold, Cumberland, Md.

1906 CAMERON 3-cylinder, air-cooled 12-h.p. runabout; fine running condition; low price. O. J. Atwood, So. Manchester, Conn.

1906 STANLEY, Model F, \$300 in extras, \$1,100; 1906 Stanley, Model EX, \$300 in extras, \$650; 1907 Stanley, Model EX, \$350 in extras, \$650; 1905 Stanley, Model CX, new, \$450; 1905 Ford 4-cylinder car, top and headlights, \$500; 1907 Ford 4-cylinder runabout, top and headlights, \$400. Portland Garage Co., Portland, Me.

\$100 TO \$500 SAVED—Buy a good new or second-hand car for next season's use. Write me to see how much I can save you on others' sacrifice prices. Light touring cars, 7-passenger cars, and gentlemen's roadsters, including Thomas, Pierce, Packard, Peerless and other standard makes, from \$640 to \$1,680; smaller cars taken in trade. C. T. Paxton, 1200 Niagara St., Buffalo, N. Y.

\$300 STANLEY STEAMER, with top and extras; seats four; in fine condition. 708 East Balto St., Baltimore, Md.

\$1,000 —I have a 1906 White steamer with detachable limousine; body also cap top and wind shield for the touring body; car equipped with new non-skid tires, speedometer, Rushmore headlights, gas tank and seat covers, and everything in excellent condition; the first offer of \$1,000.00 gets this bargain. W. A. Madigan, 5905 Centre Avenue, Pittsburg, Pa.

Cars Wanted

A FOUR CYLINDER light touring car, American make, 1906 or 1907 model; give full particulars and cash price. Address H. M., care The Automobile.

A UTOS WANTED—One or a hundred; spot cash; whole stocks wanted; new or second-hand. Broadway Auto Exchange, 245 West 56th St., New York City.

R UNABOUT or light touring car. C. Thomas, 304 Lafayette Ave., Buffalo, N. Y.

WANTED—To buy standing touring car, in almost perfect condition, in London or Paris, June 10. Address D. E. Gibson, Canon City, Col.

1907 PACKARD, Peerless or Winton M. touring car; state fully guaranteed condition and lowest price. G. R. DeLaureal, M. D., Broussard, La.

Parts and Accessories (WANTED)

B OILER WANTED—Copper tube auto boiler, with burner, about 15 horsepower; must be good and cheap; send description and price. A. Watkins, Des Moines, Ia.

Parts and Accessories (FOR SALE)

AUTO TIRES—All the best makes of tires on hand, at cut prices; a big stock of "specials" and "seconds" at "Bargain Counter Prices"; we will save you money on any make and any size; write or call. Broadway Mammoth Automobile Exchange, 245 West 56th St., New York City.

AUTO TIRES—New and second-hand auto tires at large discounts; expert repair work, including recovering and applying of Bailey treads, etc. Broadway Rubber Tire Works, 53 West 63d St., near Broadway, New York City. 'Phone, 5384 Columbus.

AUTO TOPS from \$25 up; also recovering and repairing; prompt and satisfactory service and lowest prices guaranteed; a specialty of automobile upholstering. Paris Auto Top Co., 312 West 52d St., New York City. 'Phone, 6444 Columbus.

AUTOMOBILE SUPPLIES of every description; 1908 catalogue now ready; write to-day for copy. Mathew Strauss, 707 Main St., Buffalo, N. Y.

BODIES—We have a few 5-passenger touring car bodies, in two sizes: 69 1/2x34 1/2 on bottom, price \$40; 80x34 1/2, price \$50. Are new bodies, finished in Quaker green, upholstered with curled hair and genuine leather; prices cash with order, f.o.b. cars Waltham, crated. Illustration and blue-prints showing all dimensions sent upon request. We also have a few steering columns with worm gear for sale; illustrations and prices sent upon request. Waltham Mfg. Co., Waltham, Mass.

CLINCHER CASINGS and tubes; all sizes: 28x3, \$10; 30x3, \$11; 30x3 1/2, \$15; 32x3 1/2, \$17.50. Single tubes, 26x2 1/2, \$9 each; 28x2 1/2, \$10; 28x3, \$12; 30x3, \$13. Seconds, \$2 less each. All kinds of tire repairing and recovering done at reasonable prices. Repaired tires for sale. Chas. E. Miller, Anderson, Ind.

DIAMOND TIRE, new 30x3-inch Bailey, \$20; one Ofeldt water regulator, new, \$12. A. E. Davenport, North Adams, Mass.

FOR SALE—New Prestolite tire tank and Wray tire pressure register, very cheap. Wm. E. Steele, Corry, Pa.

FOR SALE—300 sets 28x3 best grade artillery wheels fitted with clincher rims, less hubs; write for bargain prices on single sets of the lot. Thomas B. Jeffery & Co., Kenosha, Wis.

FORD RUNABOUT owners and agents, the Imperial magneto, \$20, saves gasoline and batteries; fully and faithfully guaranteed. The Motor Shop, 232 Mass. Ave., Indianapolis, Ind.

FORD RUNABOUT OWNERS—You can make a handsome "Roadster" of your car, with our rumble seat and trunk, glass front, new fenders with brass bound running boards, folding hood, "hood dash," etc.; send for catalogue; avoid spring rush; order now, and save money. Auto Rebuilding Co., Chicago, Ill.

FORD RUNABOUT OWNERS—I can sell you a magneto that is simple, durable and easily installed. Write me. I can save you money. John Ross McKay, Box 143, Caledonia, N. Y.

GLASS FRONTS, \$12; simple, durable, correctly made; easily attached to fit any car. Ford owners and agents, we have a "Special." The Motor Shop, 232 Mass. Ave., Indianapolis, Ind.

NEW 10-h.p. Holsman 4x4 opposed air-cooled motor; \$75. Butts, Oxford, New York.

PACKARD TRUNK, whistle, fine French gas lamps, wind shield; all Packard 1907 and new, at half price. F. Parks, P. O. Box 2898, Boston, Mass.

REBUILD YOUR CAR into "Gentleman's Roadster." We make latest style hoods, radiators, tanks, fenders, "hood dashes," glass fronts, rumble seats and trunks, etc. 20 per cent saved, your old car re-designed free. Hood and dash outfit for '03 and '04 Ford, Cadillac and Winton in stock. State your needs for catalogue. Auto Rebuilding Co., Chicago, Ill.

SINGLE CARBURETER outfits complete for '05-'06 Reo; ditto Buick, Maxwell, Cadillac, Ford; also commutators, tire treads, top hoods, slip covers, under shields, running boards, mud splashes, other specialties; state your wants. Jenkins Specialty Mfg. Co., Sumter, S. C.

SEVENTEEN 2 1/4-inch and thirteen 3-inch Grant roller bearings; original cost, \$14 per set; will sell for \$5 per set; reason for selling, not the proper size for our needs. Knox Automobile Co., Springfield, Mass.

THREE new Prest-O-Lite tanks, filled, only \$30 each. Dr. Flanders, Burlington, Vt.

TIRES for automobiles; brand new goods; overstocked: 28x2 1/2, \$8; 28x3, \$14.50; 28x3 1/2, \$14.50; 30x3, \$14; 30x3 1/2, \$16.50; 30x4, \$18.75; 32x4, \$20; write for other sizes; will surprise you. A. H. Kasner, 152 Church St., New York. Largest Tire Dealers in U. S.

TIRES—We sell any tire on the market; new casings at the following prices: 28x2 1/2, \$9 each; 28x3, \$17 each; 30x3 1/2, \$20 each; 32x4, \$26 each; 24x4, \$27 each; other sizes and tubes in proportion. Chicago Vulcanizing Co., 1463 Michigan Ave., Chicago, Ill.

THREE slightly used 34x4 Goodrich Q. D. casings; two new Goodrich clincher casings, 32x4. John Haupt, 130 William St., New York City.

WIND SHIELD—Never Used; first-class in every way; 42 inches wide; standard. J. G. Pleser, 235 Johnson street, Chicago, Ill.

66-LIGHT 110-volt dynamo for best offer over \$50. Butts, Oxford, New York.

\$12 EACH, while they last, for new tires listed at \$39.80; size 30 by 3 1/2. 334 West 41st St., New York.

Situations Wanted

ADVERTISING EXPERT and publicity pro-motor, well acquainted in automobile field, wishes position with manufacturer seeking to curtail expenses and get increased results. M. P., care The Automobile.

AUTOMOBILE OWNERS—I invite correspondence with you who wish to engage a successful driver and mechanic; \$300 security furnished. Address Box 95, care The Automobile.

CHAUFFEUR desires position; can handle and keep up any car; references. Address "First-class," care The Automobile.

CHAUFFEUR, graduate New York School of Auto Engineers, desires position in city or country. Address Box 79, care The Automobile.

CHAUFFEUR—American, with four years' factory and road experience, desires position; strictly temperate; moderate salary; will go anywhere; write for particulars. Address 1412 W. Main, Laporte, Ind.

GERMAN FITTER-CHAUFFEUR—Reliable and sure; wants engagement for factory or private, as traveling fitter, for driving in or chauffeur; would go to the South; best certificates and references can be given. Apply to Y. Richter, 158 East 22d St., New York City.

POSITION WANTED, by A-1 repairman and machinist; six years manager of garage; best of reference and strictly temperate; anywhere in United States; steady position. Address "Connecticut," care The Automobile.

SALES or factory position; sixteen years' experience, all departments; excellent references; go anywhere. Address "G. R. M." care The Automobile.

Help Wanted

IF YOU WOULD consider a better position, or more money, or a change of location, write us to-day; 3,000 office sales and technical positions open; service confidential. Hapgoods, 305 Broadway, New York, or 1010 Hartford Bldg., Chicago.

WANTED—An experienced bicycle and auto repairer; partnership considered; write. Auto Garage, Box 563, Waseca, Minn.

Insurance

INSURANCE for automobiles—Broad, safe policies at lowest prices; insurance against fire, self-ignited explosions, transportation hazards, theft, etc.; best services guaranteed, no matter where insurer is located. For particulars address H. W. Beals, 76 William St., New York City. 'Phone 3052 John.

INSURANCE for motor cars against every risk, including fire, explosion, self-ignition, theft, collision, accident, transportation, perils and other damages; cars insured anywhere in the world by the kind of "Policies that Protect," at the lowest rates of premiums; automobile bail bonds to cover all States; demonstrating policies for the trade. Dixie Hines, Times Building, New York City.

Automobile Schools

WANTED—Every man in New England who is interested in automobiles, to learn of the automobile school run by the Boston Young Men's Christian Association. It is the oldest, best equipped, and is considered the best taught school for men in New England. Do not spend a dollar for such instruction until you have seen our circular; do not remain untrained. Address Mr. F. P. Speare, Educational Director, 458 Boylston St., Boston, Mass.

817 MEN who enrolled in our automobile school last season say their time and money were well invested. Our courses are thorough and practical. We have a large garage, completely equipped, and expert instructors. The school is not run to make money, but to give men a thorough course of instruction at a minimum cost. Catalog sent on request. West Side Y. M. C. A., 310 West 57th St., New York City.

Miscellaneous

ACCOUNTING FOR GARAGES—Profits increase, losses decrease when you know exactly where each occur; you may know this and much more every month if you use the Standard System; write for further particulars. L. B. Baker, Public Accountant, Waterbury, Conn.

AND OPPORTUNITY to establish a modern, up-to-date garage in New England city of 25,000 inhabitants. For sale, a first-class building on main street of city, three blocks from post office. No agencies now in city, and only one other small garage. Building large enough for light manufacturing besides garage. Address "Douglas," care The Automobile.

BIGGEST BARGAIN, one Hendley 15-inch lathe; not used 3 months; has separate rod and screw feed; 1 1/4-inch hollow spindle, 2 universal independent 3 and 4 jawed Skinner chucks, which cost \$70 alone; complete with tools, counter shaft, all gears, etc.; \$150. Original cost, \$650. Address "Lathe," care The Automobile.

FOR SALE—A one-third interest in the largest and best garage and repair business in the entire Southwest; in a city of 45,000 people; does a business of about \$40,000 per year; best of reasons for selling. Address Box 415 Galena, Kan.

PRICE IS RIGHT and terms easy; established automobile service for sale, with automobiles and sundries; the best chance ever offered to make money in the best growing seaside resort in Jersey; Summer population 70,000; no opposition. We invite you to investigate. Wildwood Auto Co., Wildwood, N. J.

SAVE YOUR TIRES—Are you going to use your car every day this winter? Will it be standing on the tires for days at a time? Do you want to save your tires? Take the car's weight from them with Garlick's Auto Props; strong, durable, cheap; set of four sent by express any address, on receipt of \$2.50; with jack attachment, \$4.00. Garlick Auto Prop Co., Paterson, N. J.

TIRE SPECIALIST—Auto tire repairing, retreading, recovering and rebuilding; right work, best materials combined with modern methods and fair prices; discount to trade. Chas. A. Bebber, Jr., 331 Michigan Avenue, Chicago, Ill.

TIRE REPAIRING is our business, and we know that our vulcanized repairs give satisfaction to our patrons. Why not give us a trial? Once a customer, always a customer of the Model Vulcanizing Co., 1547 Michigan Ave., Chicago, Ill.

TIRE REPAIRED—Automobile owners, do you want your tires repaired or recovered by people who know how? Give us a trial and be convinced. Inner tubes vulcanized at short notice. Jungking & Vogler, 158 Chambers St., New York City. Telephone, 3586 Cortlandt.

(Special Notices continued on page 56.)

(Continued from page 55.)

TIRES RETREADED and repaired—One-fourth to one-half less than factory prices; absolutely nothing but the highest grade of material used; factory experienced workmen; material and workmanship guaranteed; write for prices. Auto Tire Repair Co., Columbia City, Ind.

TIRES RECOVERED—\$12 up; according to size; non-skid, leather rivet shod tread, \$15 up; all kinds repairs done promptly and reasonably; very best material and workmanship; all re-covers guaranteed 2,000 miles; good second-hand tires \$10. New York Steam Rubber Tire Repair Works, 306 West 52d St., New York City.

WANTED—Name and address of every automobile garage and repair man in the country who is interested in a new combination steam vulcanizing machine for auto tires and tubes; only outfit of its kind ever put before the American people. Send for circular and price list, to the Combination Steam Vulcanizer Co., 673 St. Peter St., St. Paul, Minn.

WHEN OTHERS FAIL in giving satisfaction in retreading tires, repairing blow-outs, etc., send your tires to us; absolute satisfaction guaranteed at a very low cost by the Old Reliable Roussey Vulcanizing Works, Fort Wayne, Ind.

WILL RENT light loft, with elevator and machinery, for automobile repairing. Apply The Empire Distributing Co., Broadway and 72d St., New York City.

W. M. SANFORD, JR., Dealer in Automobile Tires, 42 West 67th St., New York. Perfect, scientific and honest repair work a specialty.

SPECIAL NOTICES

TOO LATE TO CLASSIFY

FOR SALE—1907 Reo runabout, fully equipped; excellent condition; a bargain at \$400. S. S. Faulkner, Troy, Ohio.

FOR SALE—Five-passenger Stanley steam touring car, \$650; folding top and fully equipped; will demonstrate at any time. Apply at McGraw's, 308 East Baltimore St., Baltimore, Md.

FOR SALE—White steam cars, 1905 and 1906; both repainted and overhauled; top, headlights, gas generator; tires in fine shape; bargains; full information on request. L. E. Bissell, Uniontown, Pa.

WANTED—Every automobile owner to use the auto time saver repair kit; mends punctures in five minutes; agents wanted. For particulars, address The Carlton Co., York, Pa.

WANTED—For cash, a bargain in a slightly used 1907 or 1908 4-cylinder, 5-passenger touring car of standard make; send full specifications and photographs of car to Box 351, Salt Lake City, Utah.

WANTED AT ONCE—A 40 or 50-h.p., 4-cylinder automobile engine and transmission carburetor, oiler and electrical equipment; state fully, size, condition, etc., also price. G. F. Ellis, Macon, Ga.

STEAM! STEAM!! STEAM!!!—550 pounds steam pressure maintained on '04, '05 and '06 White steam cars by the Wilson controlling system. For sale by M. R. Dick, 249 Third Ave., So., Minneapolis, Minn.

Wind Shields \$12

Neat and durable. Cannot be cut with glass when in a collision.

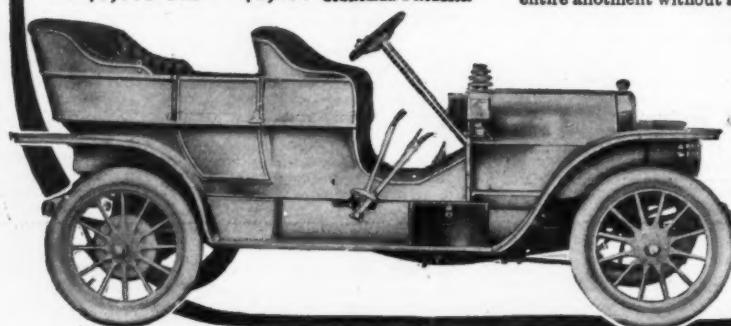
Runabout Tops \$16.00 and \$18.00. Complete Curtains and Rail.

Guaranteed to fit Ford, Maxwell and Olds. Description on application. Chicago Auto Top Co., 80 W. Jackson Boulevard, Chicago.

THE CAR THAT SELLS ITSELF

High-Grade Construction at a Popular Price

POWERFUL—ELEGANT—SILENT
The Wise Ones Know that the MIDLAND is
"Right"—Made Right—Price Right
The Renault Type Engine—built in America
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\$10,000 French Car.
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A \$5,000 Car for \$2,250 Touring Car or
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LISTS

of all Automobile Dealers, Garages, Charging Stations, Repair Shops, Dealers and Jobbers of Supplies, Purchasing Agents, Mechanical Engineers, etc. Write for our proposition.

The AUTOMOBILE TRADE DIRECTORY

Flatiron Bld.,
New York

The Complete Motorist

One theory, but all about an automobile—its history; its mechanism and how to select and run it. By A. B. FILSON YOUNG. 228 pages, profusely illustrated. Bound in cloth. Price, 65-50. Address The Automobile, Flatiron Building, New York.

The Wyman & Gordon Co.



OUTFITS AND SUPPLIES

Curtain Fasteners

We are sole manufacturers of "The Brewster" "Perfect" and "Excelsior" Curtain Fasteners, recognized as the best made. Also headquarters for Moulding, Moulding Points, Imitation Stitched Moulding, Celluloid, Snap Loops, Strap Loops, Snaps, Knobs, etc.

Write for Catalog and prices.

C. COWLES & CO., New Haven, Conn.



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Highest Award
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Louisiana Purchase Exposition
St. Louis, Mo., 1904.
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all over the world. Ask or write
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MIXTURE OF GASOLINE AND
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less of Engine speed,
condition of atmosphere
or whether run on low
throttle or wide open.

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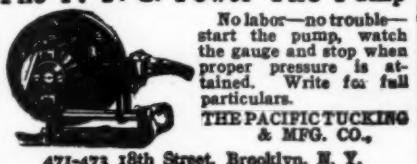
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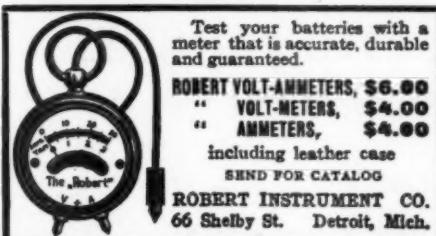
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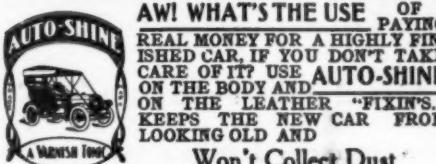
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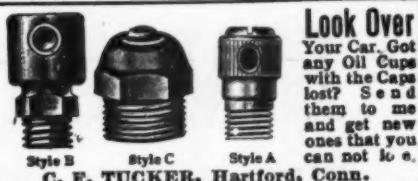
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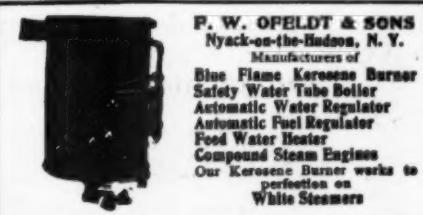
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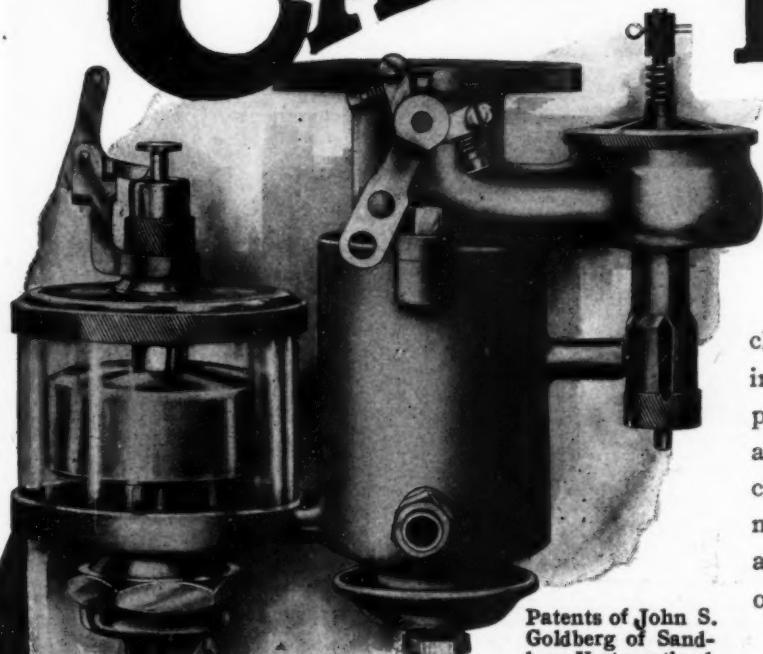
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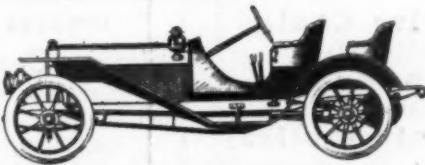
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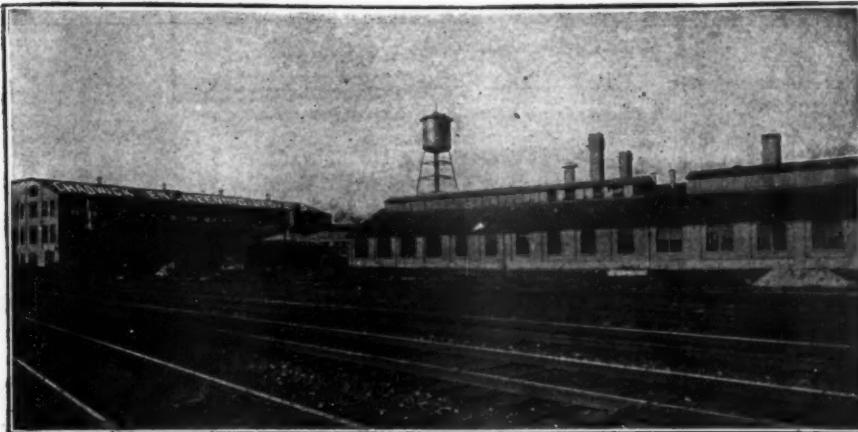
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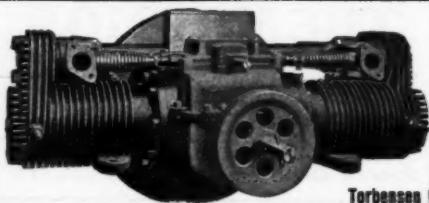
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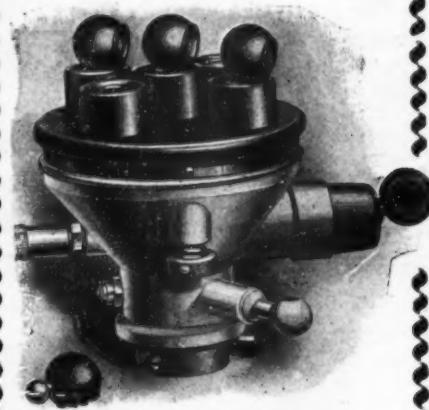
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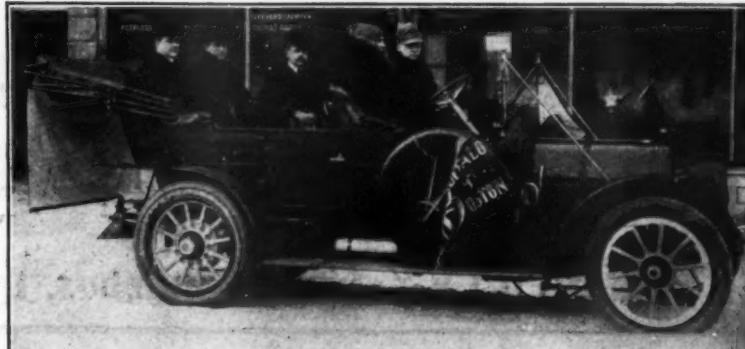
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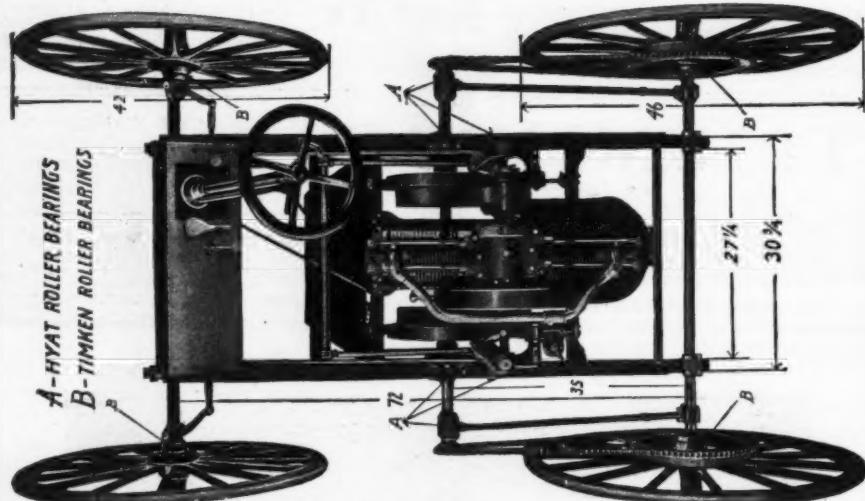
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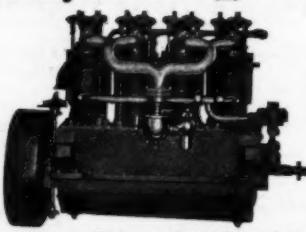


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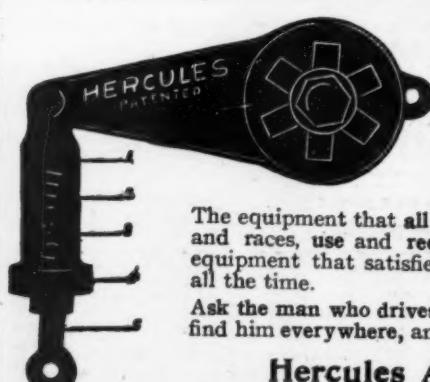
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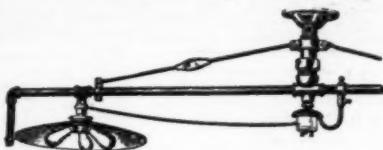
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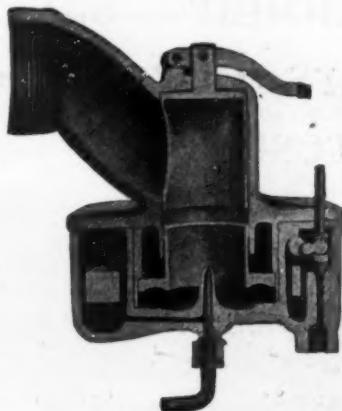
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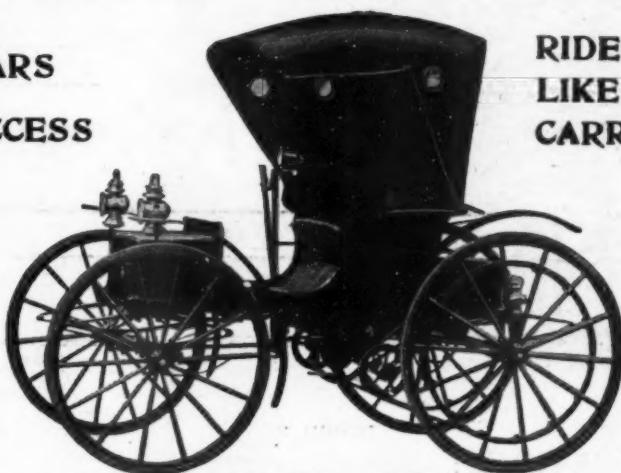
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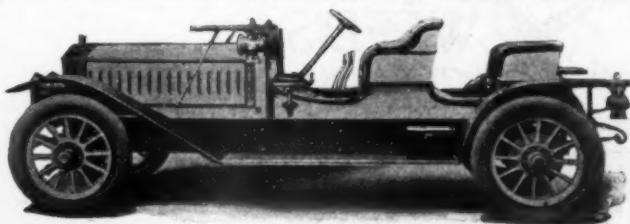
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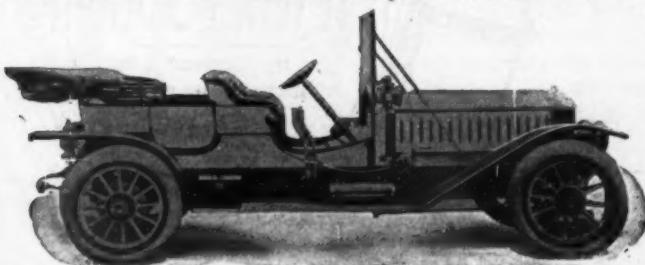
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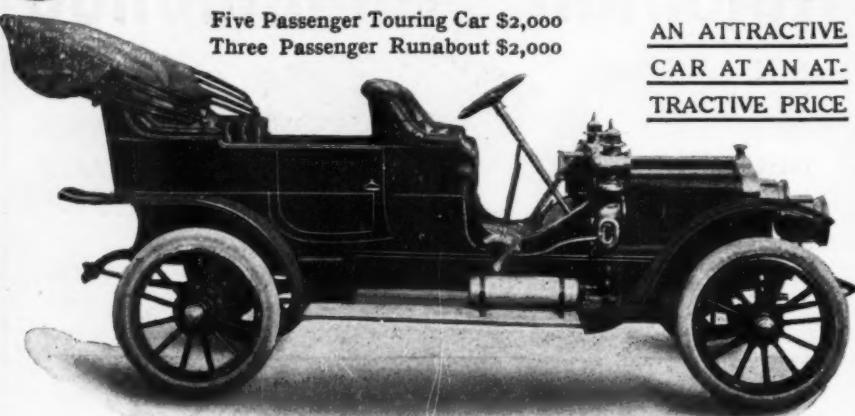
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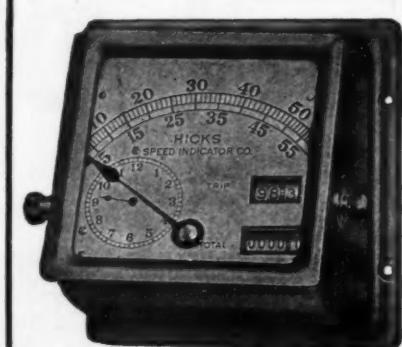
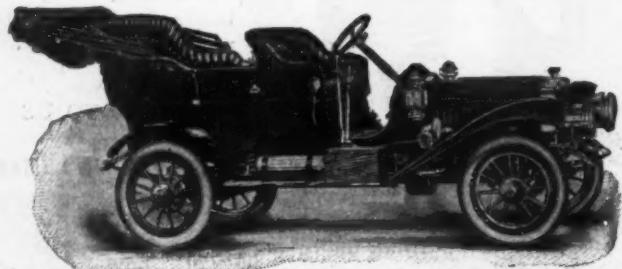
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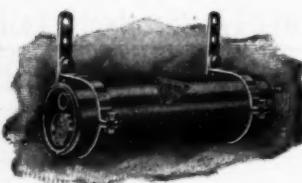
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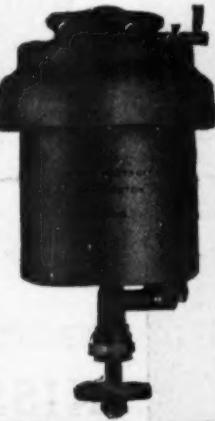
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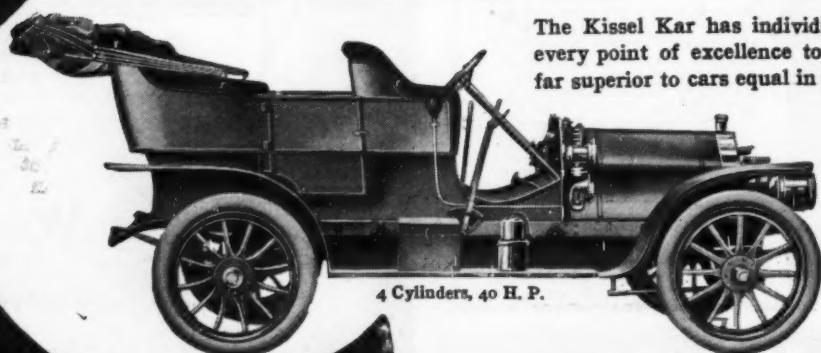
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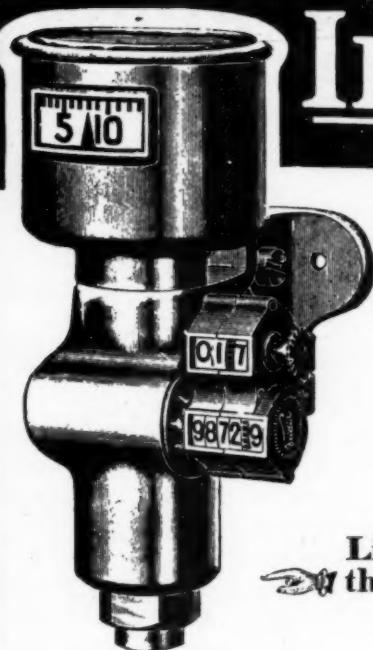
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STRENGTH, ACCURACY AND DEPENDENCE

THE STANDARD WELDING CO.

CLEVELAND.

Here it is!



BULLARD AUTOMATIC WRENCH CO., PROVIDENCE, R. I.

Try us for high grade drop forgings Quick deliveries.

BULLARD AUTOMATIC WRENCH

The wrench with the human grip. For use anywhere and everywhere, on anything and everything. Special proposition to manufacturers for your 1908 tool kit.

Motorists: Specify Bullard No. 2 or buy from nearest dealer to get maximum wrench efficiency.

Sales Agent, JOHN H. GRAHAM & CO.

113 Chambers Street,

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LOCKE & COMPANY AUTOMOBILE BODIES

218-220 WEST 84th ST.,
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WITHOUT PARALLEL IN THIS COUNTRY OR ABROAD
COMBINE EXTREME ELEGANCE, MOST REFINED
DESIGNS AND UNEXCELLED DURABILITY



Represented at
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FASTENERS

All styles and sizes for AUTOMOBILES. Now used on the leading Motor Cars. Prompt Deliveries. Write for prices.

UNITED STATES FASTENER COMPANY

Manufacturers of Snap Fasteners and Metal Goods.
95 MILK STREET, BOSTON, MASS.

WE MANUFACTURE FOR THE AUTOMOBILE TRADE

Complete Front and Rear Ball-Bearing Axles

THAT ARE WELL-KNOWN FOR DURABILITY AND EFFICIENCY

Call on or write us regarding your requirements.

THE AMERICAN BALL-BEARING CO., CLEVELAND, OHIO, U. S. A.

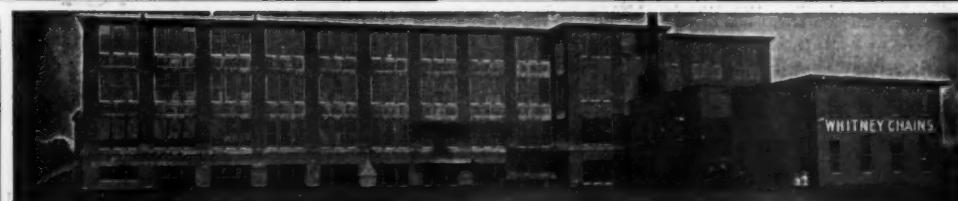


Write for Catalogue J.

B-LINE OIL-GREASE GUNS

ALL METAL CONSTRUCTION. PISTON GROUND TO FIT.

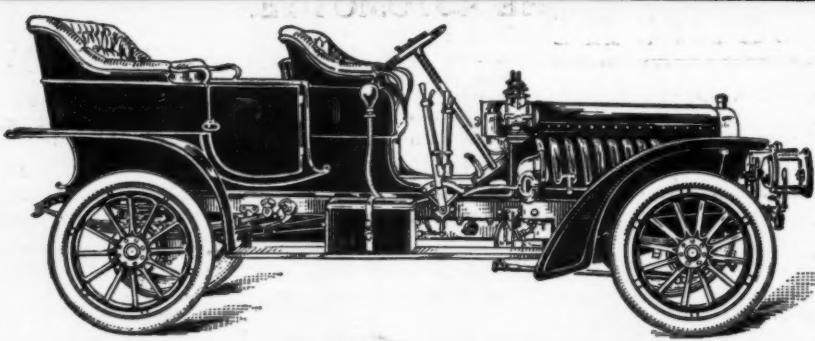
RANDALL-FAICHNEY CO., Boston, Mass.



"WHITNEY" CHAINS

New Fireproof Factory. New Machinery and Improved Methods.

THE WHITNEY MFG. CO., Hartford, Conn.



Apply this TEST to the STEVENS-DURYEA---

Here's a simple quality test you can make for yourself prior to purchasing a motor car. Make a visit to the second-hand dealers and consult the "Automobiles for Sale" columns in the newspapers and Automobile Journals. It is obvious that the cars which are the most difficult to secure and depreciate the least in value are the cars of quality.

It is difficult to find Stevens-Duryea cars in the second-hand market. They are not built on the change-models-every-year plan—they are not out-of-date in a season. Moreover the Stevens-Duryea Unit Power Plant and Three Point Support make possible a car of wonderful simplicity and durability. Therefore the small price depreciation in the Stevens-Duryea when you *do* find one.

Apply this test for yourself. Measure the Stevens-Duryea with any other car on this basis. The second-hand market is a barometer of automobile quality. Every car then stands on its merits alone.

STEVENS-DURYEA CO.
CHICOOPEE FALLS, MASS.

MEMBER A. L. A. M.



Lever does not interfere with springs, body, truss rods or steering gear.



The RELIABLE JACKS

are so simple in construction that you will have to see one before you will believe that a practical and durable jack can be made of so few parts.

It is the only jack that will go under all cars without interfering with truss rods, steering gears, springs or body.

No.	Weight	Capacity	Adjustment	Price
1	5 lbs.	2 tons	10 $\frac{1}{2}$ to 18 in.	\$3.00
2	8 lbs.	3 tons	12 to 20 in.	4.00

VEHICLE JACK

No.	Weight	Capacity	Adjustment	Price
1	5 lbs.	2 tons	15 to 24 in.	\$3.00

ELITE MFG. CO., Ashland, O.

The Rutenber Line

30 to 60 H. P.

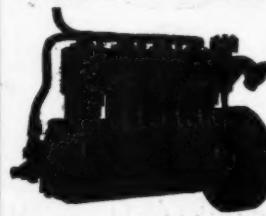
4-cylinder, 4 $\frac{1}{2}$ x 5	EQUIPPED WITH OR
4-cylinder, 4 $\frac{1}{2}$ x 5	WITHOUT MAGNETO
4-cylinder, 5 x 5	AND CARBURETOR
6-cylinder, 4 $\frac{1}{2}$ x 5	

The Rutenber Motor holds world's record of 1,094 1-16 miles in 24 hours.

Rutenber Carburetors best of all.

For your own benefit get further particulars. Let us figure on your 1908 requirements. Let us prove by test our motors are far the best and that they are the motors you should have on your cars. Write to-day.

Rutenber Motors and Carburetors the Best for Your 1908 Cars
Motors and Carburetors of the highest quality embodying in their construction the most skilled workmanship and the best material obtainable, at a cost no greater than you are asked to pay for machines that are unreliable and that will last only a short time. Made in the largest factory in this country devoted exclusively to the manufacture of motors and carburetors.
30 to 60 H. P. 4 and 6 Cylinder Motors. Write for Catalog.
THE WESTERN MOTOR COMPANY, Logansport, Ind.



"BANKER"

WIND SHIELD No. 2

THE BEST

Wind Shield in the world, the only shield manufactured that has a single or double fold over the hood without the line of vision obstructed across the center of the glass. Folds flat entirely out of the way when you want it down. Made to fit any automobile. Write for full description and price. Agents wanted.

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Baum and Beatty Sts., PITTSBURG, PA.



WISCONSIN TIRE PROTECTOR

NON-PUNCTURES PATENT PENDING
NON-SKIDDING



PROTECTORS *that* PROTECT

The only Protector made of Rubber and Leather. The only Protector guaranteed to stay on the wheels. It is Puncture Proof and harmless to tires. As more than 90 per cent of the serious automobile accidents are caused by skidding, their extreme anti-skidding qualities make them a necessity.

THE WISCONSIN TIRE PROTECTORS are made from three thicknesses of specially woven fabric covered with the best mechanical rubber. On either side of these is a layer of best chrome leather, all five being riveted together with steel rivets; the countersunk, case-hardened washers outside forming antiskid studs. We have experimented for the past two years and we have found that it is absolutely necessary to have a combination of rubber and leather to prevent the PROTECTOR from stretching and becoming *baggy* on wet and muddy roads.

Thus constructed the tread is securely laced to a steel spring wire ring formed in such a way that there is at all times a tension on the lacing holding the Protector firmly in place. The ring is in turn attached to the hub. All parts of the Protector are of the best possible workmanship and material, are strong, durable, and an ornament to any car.

Write for further details and prices of Protectors, giving size of wheels.

Wisconsin Tire Protector Company,

Factory, Stevens Point, Wis.

1231 Michigan Avenue, CHICAGO, ILL.



OPPOSITE THE FALLS

Tower Hotel
The Home of the Brides
Niagara Falls, N. Y.

European Plan, \$1.00 up.
American Plan, \$2.50 up.

One Minute's walk from the Falls, directly opposite N. Y. State Park

Special Rates to Large Parties

FREE. Enclose 5 cents in stamps to cover costs and I will send you one of the finest colored double postal cards ever gotten up of Niagara Falls, and it's a Beauty

M. J. HOENIG, Proprietor



Go South to the Land of Sunshine

Piney Woods Inn
Southern Pines, N. C.

Southern Pines, N.C., has been aptly termed the "Capital of Sunshine Land." In the long leaf pine region, sandy soil, a mild, dry climate, tempered by the winds of the Gulf Stream. No fog, no dews, no malaria. Pure spring water. Golf links surround Piney Woods Inn. No charge to hotel guests for use of links. Ideal conditions for golf prevail at Southern Pines. Not too cold—not too warm, and a "sporty" course in perfect condition. Saddle riding, tennis, trap shooting and all outdoor sports. No consumptives received. An elegant hotel. Rooms en suite with private baths.

Rates \$2.50 to \$5.00 per day. ST. JOHN & SON, Managers.

Parties en route for Pinehurst, Camden and all Florida points, should stop over at Piney Woods Inn—on the main line of the Seaboard Air Line. Superb passenger service. Pullman's latest car.



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Irving Place and 16th St.,
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One block from UNION SQUARE, Surface, Elevated and Subway Cars. Midway between leading WHOLESALE and RETAIL STORES and THEATRES, and yet far enough from Broadway to insure COMFORT and FREEDOM from the noise and bustle of that thoroughfare. PERFECTLY GUEST locality and HOME-LIKE in every respect.

**EXCELLENT CUISINE,
EUROPEAN PLAN**

Single Rooms, \$1.00 per day and up. Room with Bath, \$2.00 per day and up. Parlor, Bedroom and Bath, \$3.00 per day and up

SEND FOR BOOKLET O. H. FOSTER, PROPRIETOR



"SPEED" CARBURETER
Solves the Carbureter problem completely

Positively guaranteed to develop greater power, speed, flexibility and economy in the engine than any carbureter in the world or purchase price refunded.

You run no risk—try it—it will save you a world of trouble and make your cars better and more efficient. Write for full particulars.

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Canadian Agency:
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Manufacturers! As this will be a short season, PROTECT YOURSELVES NOW. Send us your blue prints and let us submit a Sample

Steering Gear

Then when the rush comes all you need say is GO AHEAD. We will ship your Gears promptly and you can be sure the QUALITY WILL BE RIGHT.

**Gemmer
Manufacturing Co.** 743 Merrick Ave., Detroit, Mich.

SALES AGENTS:
Brandenburg & Co. New York Detroit Chicago

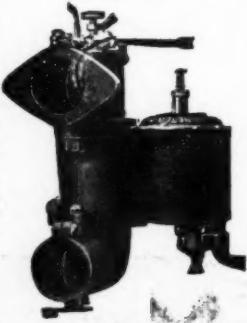
A SECTIONAL VIEW
showing the working arrangement of the

BUFFALO CARBURETOR

is so convincing of its simplicity that an order always follows its inspection. Let us send you one.

The Buffalo Carburetor Co.
887-899 Main Street
BUFFALO, N. Y.

National Sales Corporation, Factory Sales Managers, 206 B'way, New York



BUCKEYE

**STRONG, SAFE,
RELIABLE**

Highest Grade Material and Workmanship. The result of 20 years experience in Jack building

Especially suitable for automobile use. Can be operated under any automobile.

Made only by the
Buckeye Jack Mfg. Co.
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AUTOMOBILE JACKS

The only Jacks on the market having High Carbon Crucible Steel Drop-forged Racks and Paws, insuring against breaking down under load.

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The handy wrench for unhandy places. Interchangeable, easily applied, locked and used at any angle. Fits any size bolt or nut from $\frac{1}{4}$ " to $\frac{1}{2}$ " inclusive.

Spark Plug Wrench $\frac{1}{4}$ "— $\frac{1}{2}$ ". Complete set consists of 8 sockets, spark plug wrench and screw driver, all case hardened steel.

Blue Mottled Finish - - \$5.00
Nickel Plated Finish - - \$6.00

If not handled by your dealer write direct.

REX WRENCH CO.
184 Summer St. Boston, Mass.

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Gave Two of Three Events
to
Diamond
TIRES—BOTH CASINGS and TUBES

11 of 14 cars in the three events used Diamond tires and changed 8 tires all told. On 3 cars with other makes, 8 tires were changed. Only 1 Diamond tire needs repairs. Four tires of other makes need repairs. *Superior wear resistance of Diamond tires was commented on by all. Note annexed telegrams:*

“Congratulate you on Diamond tires and Marsh rims on which Apperson car won Runabout race. Not a tire touched. Were used two weeks before race. In the 342 mile event Diamond tires and your demountable rims helped bring me from fifth place in 16th lap to second place at finish. We made time over rough places I would not have dared make on any tires but Diamond and they are in splendid shape at finish.”

HERBERT H. LYTLE.

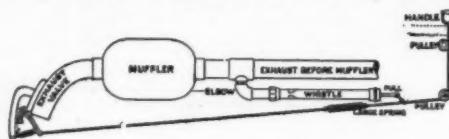
“Diamond tires have once more done their share in another Thomas victory; winning the Southern 6-cylinder Cup.”

H. E. COFFIN, Vice Pres. E. R. Thomas-Detroit Co.

THE DIAMOND RUBBER CO.
AKRON, OHIO



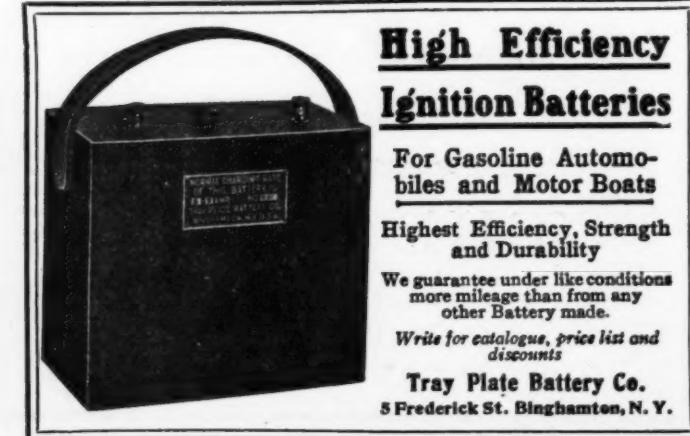
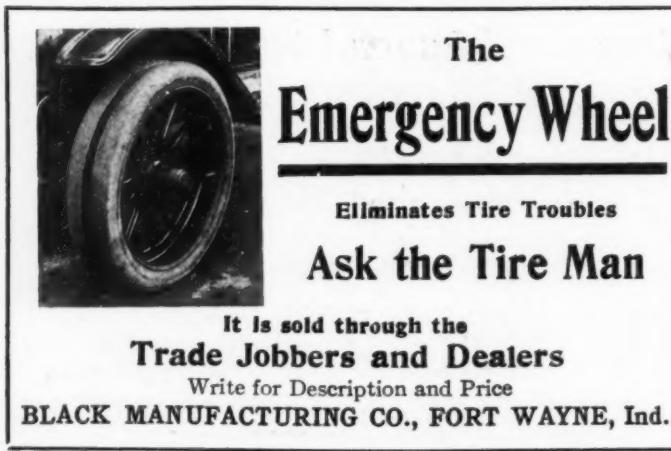
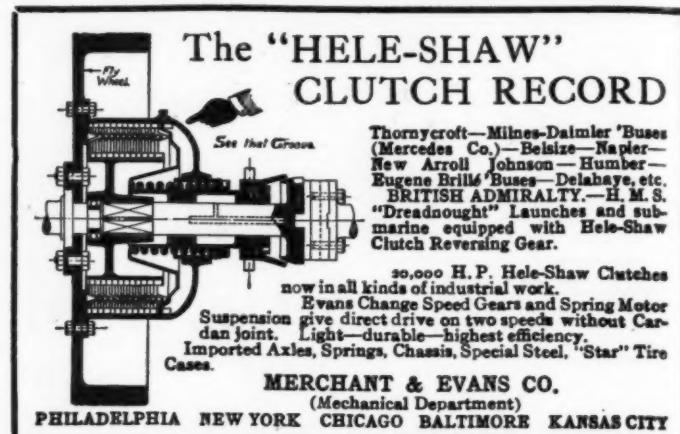
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WITHOUT A FLAW**
THE NIGHTINGALE



Cannot get out of order. Automatically cleanses itself. Sounds a melodious six note trill that can be heard for miles.

Ask your supply house or send for catalog No. 15.

COMPTOIR D'INNOVATIONS POUR AUTOMOBILES
1693 Broadway, New York
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AJAX

WRAPPED TREAD TIRES

**GUARANTEED
FOR
5,000 MILES
RIDING**

Write for a copy of that
Guarantee, stating size
tire you are using.

Address Dept. C

**AJAX-GRIEB
RUBBER CO.**

General Office:
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57th Street and
Broadway
NEW YORK

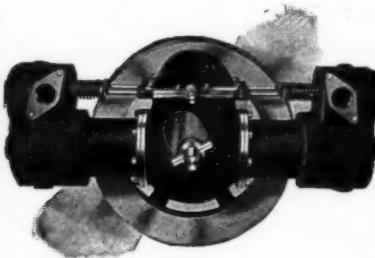
Branches or
Agents in
all large
cities



JUST THINK IT OVER

IT MEANS PERFECT IGNITION

\$1.50 each. At your dealer's or postpaid on receipt of price.
JEFFERY-DEWITT CO. 222 HIGH STREET NEWARK N. J.

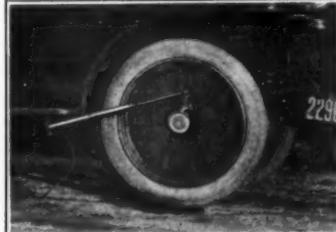


NO FUSS about the BEILFUSS

Two cylinder. Water
cooled or Air cooled; 10-
12 H.P., Water or Air
cooled; 18-20 H.P.,
Water cooled.

Send for Circulars and Prices.

THE BEILFUSS MOTOR COMPANY,
Lansing, Mich., U. S. A.



STOP PUMPING!

Let this wonderful device
pump up your tires in two
minutes. It utilizes the car's
own power. No more back-
breaking.

The Rung Automatic Tire Pump

Easily attached to any automobile. It fills the tire while you sit at
the wheel. Send for handsome illustrated booklet, giving terms, etc.
Territory open for active agents.

WHITMER & RUNG 200 Girard Trust Building
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Mound Tools

For the Automobile

Cut represents our new set of
20 tools gotten up for use in auto
repair work. Strictly high-grade
tools with all the good points of
tool-smithing in their make-up.

Conveniently arranged in finished
oak case, and every tool is highly
polished and guaranteed.

No. 1 Set of 20 Tools, - \$4.50
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Hollow Ground Scrap-
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No. 25. Set of 3 Carbon
Scrapers - - \$2.50

If your dealer cannot supply you, we will.
Send for free circular.

MOUND TOOL AND SCRAPER COMPANY, Toolsmiths
708 Howard Street, ST. LOUIS, MO.



**\$2.00 PREPAID TO ANY ADDRESS
IN THE U. S.**

GIVE A CARE to your gasoline pipe
strainer, as nine times out of ten
carburetor troubles are due to imperfectly
strained gasoline. A little water or for-
eign substance in the gasoline will put
your carburetor out of commission. Our
strainer is a guarantee against such troubles.
It is made from sheet brass, highly polished, and
furnished with either 1-4 or 5-16 inch connections.
The gasoline enters through the low connection,
strains through a chamois placed at an angle
across the globe, and passes to the carburetor
through the upper connection, cleansing the gaso-
line thoroughly. The foreign substance remains
beneath the chamois and may be drained through
the petcock.

The Hatcher Auto-Parts Co. 185 Viaduct
CLEVELAND OHIO

3 TON

5 TON

"AMERICAN" TRUCKS

"WE DELIVER THE GOODS"
WRITE US

AMERICAN MOTOR TRUCK CO.
LOCKPORT, NEW YORK

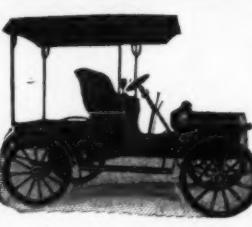
Ownership of the
Full-Jeweled



includes the certainty of constant, efficient service at
a remarkably low cost of maintenance.

Advance Catalogue upon request.

CORBIN MOTOR VEHICLE CORPORATION
Member Association Licensed Automobile Manufacturers
NEW BRITAIN CONNECTICUT
1888 Broadway, 62d Street, New York



JEANNIN Commercial and Pleasure MOTOR CARS

Direct Shaft Bevel Gear Drive. Air
Cooled Engine. Car Serviceable the Year
Around. Nothing Under the Car Requir-
ing Any Attention. Solid Rubber Tires.
Good Road Clearance.

Commercial and Light Delivery Car, \$750.00 Doctor's Professional, \$675.00
Closed Top Delivery Car, 800.00 Runabout, 625.00

First Class Material and Workmanship

ENGINE AND CARS OUR OWN DESIGN AND CONSTRUCTION

Manufactured by Jeannin Automobile & Manufacturing Co.
1221 and 1223 N. Vandeventer Ave., St. Louis, Mo., U. S. A.
(Write Us for Particulars)

BUILT IN THE HILLS



WE USE THE
FAMOUS
RUTENBER
40 H.P. MOTOR



\$2,500

GLIDE PRICE IS THE MEASURE OF REAL CAR VALUE

Why pay more—except to satisfy price pride? If you do, what do you
get for your money?

Motor—Selective Transmission, nor axles waste any power, therefore a

Showing is made on hills in speed and through mud or sand.

Reliability has been established by owners touring from state to state,
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bearings eliminate friction. Continued satisfactory service is the result.

A car of comfort and perfect control. Write for catalog.

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The THOMAS

America's Champion
in the
New York-Paris Race
Send for map and route card.

E. R. THOMAS MOTOR COMPANY
Member A. L. A. M.

BUFFALO, N. Y.



Model C, 30-H.P.,
4 Cylinder
Price \$2,500.

THE CAR OF SIMPLICITY.

The days of large cars are over, why not buy a car
that will take you everywhere, with less gasoline,
general upkeep and tire expense?

DORRIS MOTOR CAR CO., St. Louis, Mo.

MONOGRAM OIL

You can't get the most out of the best engine
without using the oil best suited for that engine.

Cedrino, the racer who drove his car

AT ORMOND

77 miles an hour, used Monogram Oil—adapted for
his engine. We adapt it to your engine too.

Just write us and name your engine.

Columbia Lubricants Co. of New York
116 Broad Street, New York City

WELCH

"The most EFFICIENT Car"

4 Cyl. 50 H.P.

WELCH MOTOR CAR CO.
PONTIAC, MICH.

AT LAST! SAFETY AND RELIEF

Simple but powerfully effective



Fully and broadly covered by patents pending

from the nerve racking, eye and body fatiguing practice of keeping one's attention forever glued on the road ahead.

Our Automatic Steering and Safety Device, or
"The Little Steersman"

will guide your car with very little attention and about 25 per cent. of the former effort.

Will carry your car over rough roads and hold it steady through sand and mud, with but slight effort from the driver.

Will make tires last longer and prevent accidents caused by driver losing control.

Write for catalogue; beats an insurance policy.

PRICE, \$10

THE ABRAMS-MASON COMPANY
CHATHAM, N. Y.

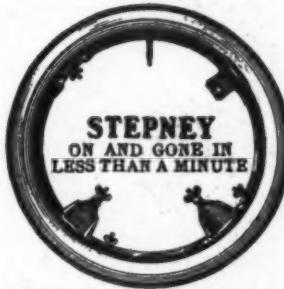
The Stepney Spare Motor Wheel. So Simple

a
Child
Can Put
it on.

The only Wheel that eliminates your tire troubles and insures yourself and guests against the delays and terrors of road repairs.

In case of puncture or blow-out, it is merely necessary for the driver to step from his car, snap on his Stepney Spare Wheel, which can be done in less than one minute, and you can at once proceed on your journey.

This is the wheel that created such sensations at the Shows in New York, Chicago and St. Louis. On a test run made under the direction of the officials of the Chicago Motor Club the Stepney Wheel was kept in active service for 325 miles between Chicago and St. Louis, over the worst roads in America and under the worst winter weather conditions. As a result, it was officially stated that every claim which we make for our Wheel was fully substantiated.



Each Wheel Registered and Fully Guaranteed.

The Stepney is part of the equipment of every Taxicab in New York, London, Paris and Berlin. Fifty thousand in use in England and the continent. Over forty thousand sold in America in less than two months. Owing to the rush of orders, our factory is working day and night shifts. To insure early delivery of the wheels, it is requested that purchasers forward their orders now. All orders taken conditional upon the wheel being satisfactory, or money instantly refunded. Write to-day for full information.

The Spare Motor Wheel of America, Limited

302 Harvester Building - CHICAGO
NEW YORK OFFICE, 341 Fifth Ave.

Perfect Auto-Cop Gloss

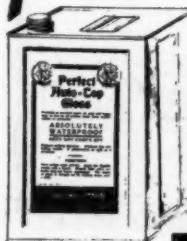
will restore and preserve the soft natural finish on your automobile and carriage tops, covers, seats, straps and guards. Perfect Auto-Top Gloss is elastic and absolutely water-proof. It will not crack or peel off nor will it soil the daintiest wearing apparel.

PERFECT AUTO GLOSS

\$3.00 per gallon, sent upon receipt of your check. PERFECT AUTO-TOP

GLOSS is the only guaranteed dressing for leather, pantasote and rubber.

Trial sample sent upon receipt of 10c to cover cost of mailing.



Jas. W. Cummer Company

2901 East 34th Street
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ECO

A Storage Tank You Can Recharge Yourself

The ECO STORAGE TANK and GENERATOR COMBINE is the only device that can show 100 per cent. efficiency. The reason is that it stores up all over and after-generation, permitting it to escape only at the lamp burners in the form of light.

The gas and unused carbide will remain in it for months without waste, ready for instant use.

**RESPONSIBLE AGENTS
WANTED IN
EVERY CITY AND
TOWN.
WRITE FOR
TERMS AND
TERRITORY**

Eco Manufacturing Co.
53 STATE STREET, BOSTON, MASS.

Mosler Spit Fire Plugs

Perfect Ignition for Auto or Motor Boat

Actually Spit Fire while others spark only! Energetic Ignition Greater Power

Beware of Valueless Imitations Insist on having the Genuine

Write for Valuable Ignition Booklet

A. R. MOSLER & CO.
163 W. 29th St., New York

Will stand more Oil, Water and Soot than any other Plug. Made to fit any engine or thread

MASURY AUTOMOBILE COLORS

MASURY AUTOMOBILE COLORS AND VARNISHES

MANUFACTURED BY
JOHN W. MASURY & SON
NEW YORK
CHICAGO - ST. LOUIS - MINNEAPOLIS

MASURY AUTOMOBILE VARNISHES

The Brown Separable LOCK SPARK PLUG

Its advantages over the stationary style of plug is in the ease of cleaning and for examination and priming. A half turn of the flat wrench releases the porcelain, the body of the plug remaining in the cylinder. It will outlast the engine. It has so many excellent and superior qualities that it will pay you to get detail information. For Sale by Jobbers.

Manufactured by
The Progressive Mfg. Co.,
Torrington, Conn.

P. S. & CO. RED INNER TUBES GUARANTEED PURE PARA RUBBER

PARKER, STEARNS & CO., NEW YORK.

BREECH-BLOCK PLUGS

Are Revolutionizing Ignition

UNEQUALED BY ANY OTHER PLUG IN EFFICIENCY AND RELIABILITY

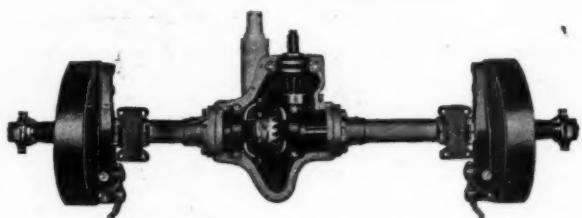
Eliminates your spark-plug troubles, saves time, tools, temper and trouble

Their perfect treads, turned tubes, large outside packing shoulders, copper asbestos gaskets, spring clip connection, protected porcelains, protected electrode packing, make them the most effective and dependable plug in the world. You may have a good plug now but none to equal the "Breech-Block." Write for full particulars or let up send you a sample plug.

THE STANDARD CO., Torrington, Conn.

SMITH AUTOMOBILE PARTS

AXLES



Pressed Steel Frames
Steering Columns
Transmissions
and
Steel Stampings of all kinds
Send Prints for Estimates

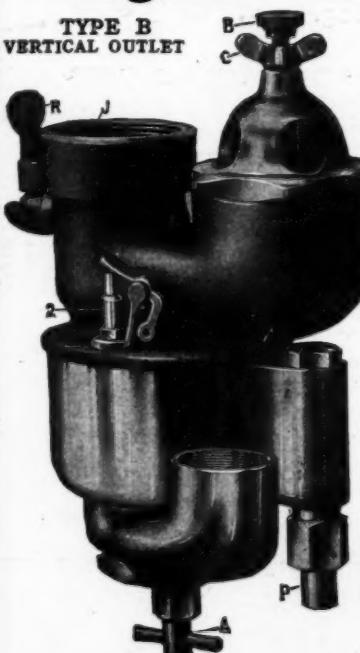
A. O. SMITH CO.

247 Clinton Street

Milwaukee, Wis.

The Pioneer Makers of Automobile Parts

Kingston Carbureters



SHOULD be the regular equipment of every car; good results require a good Carbureter. "Kingston" Carbureters insure reliable carburetion—a uniform and perfect mixture, ALWAYS. They meet all running conditions most satisfactorily and are most durable and economical. Owing to their all-round perfection they have gained a most extensive popularity in all parts of the world.

Over 77,000
now in use

The 1908 line consists of eight different types to meet every possible requirement. They are the same dependable, efficient Carbureters of quality they have been for years, changing only in new features and improvements as new conditions demand.

"Kingston" Carbureter on a car is a small thing to look for, but a big thing to find, for it guarantees that so far as Carburetion is concerned it is the most reliable car in the world.

INSIST ON "KINGSTON"

Sold by leading jobbers throughout the United States.
Send for special descriptive Catalog.

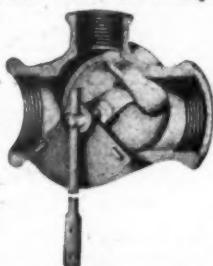
BYRNE, KINGSTON & CO., Kokomo, Ind., U.S.A.

Eastern Distributor—CHAS. E. MILLER, 97 Reade St., New York City
Canada Distributor—JOHN MILLEN & CO., Toronto and Montreal

The Echo Horn



Simple, strong and dependable. A perfectly blended signal that receives instant attention. Price complete with valve, \$20.00



Self-Cleaning Exhaust Valve

The Echo Horn Self-Cleaning Valve

shears off the carbon deposit at each stroke.

IT WILL NOT STICK.

We also manufacture a Muffler-Cut-Out on the same principles.

THE ECHO HORN COMPANY

411 TENBUSH BLDG., CLEVELAND, O.
FACTORY SALES CORPN., CHICAGO, ILL.
Western Distributors.

BEAVER "WORK LIKE BEAVERS" MOTORS

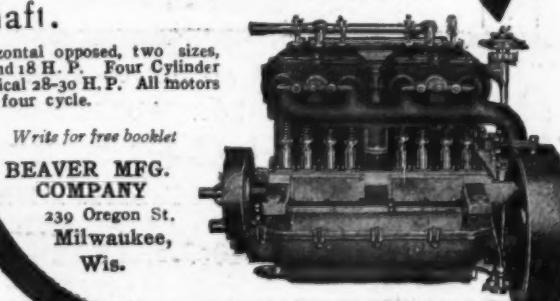


Are built after designs which give efficiency in operation rather than cheap shop production. They "make good" in your car, are quick on the start, silent and smooth running, easy of access and easily installed. Bearings of Parson's white brass will never score the shaft.

Horizontal opposed, two sizes, 12 and 18 H. P. Four Cylinder Vertical 28-30 H. P. All motors are four cycle.

Write for free booklet

**BEAVER MFG.
COMPANY**
239 Oregon St.
Milwaukee,
Wis.



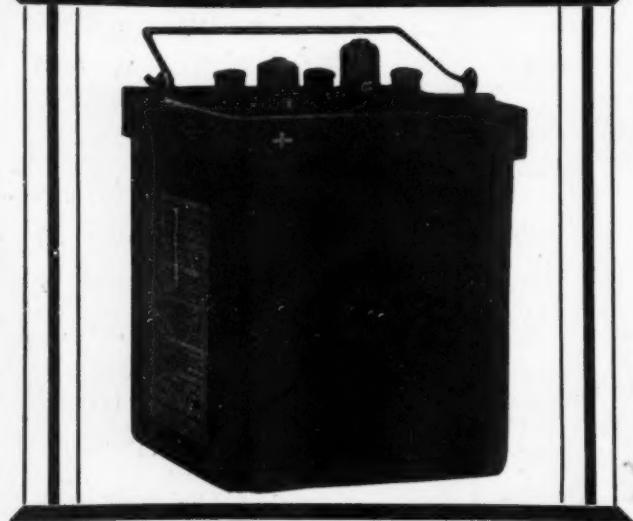
Like a Royal Flush

to use "Moss" Cuts in getting up your Catalogs, Booklets, Trade-paper or Newspaper Ads, Mailing Cards, Circulars or any Advertising Matter. You hold the winning hand over all competitors for "Moss" Cuts are as perfect as can be produced for letter press printing. They show the object up almost as clearly as a personal inspection and add 100 per cent. to the attractiveness and selling quality of your advertising—"Moss" Cuts have the "life," "snap" and "go" necessary to sell your product. Send us your orders—we guarantee satisfaction in quality, promptness and price.

MOSS PHOTO-ENGRAVING CO.
295-309 LaFayette St. (Cor. Houston
"Puc' Bldg.") NEW YORK



REX Storage Igniters



SPECIAL PRICE ON 4-VOLT, 60 AMPERE
HOUR BATTERY FOR AUTOMOBILES
—\$8.25—
PACKED READY FOR SHIPMENT

The New England Motor Co., Lowell, Mass.

YOU TAKE NO CHANCES WITH OUR XX CENTURY JACK

Note that the reversing lever does not project from the frame, and is always *locked* for raising or lowering. No careless blow can trip this mechanism, so YOU DON'T NEED AN ACCIDENT POLICY BEFORE GOING UNDER THE CAR.

XX Century Jacks are made with the same care from the same materials as our heaviest jacks (200 tons), and any one which does not stand our rigid tests never leaves the factory. You are thus doubly protected in buying the XX Century. *WRITE FOR PRICE.*



THE JOYCE-CRIDLAND CO.
DAYTON, OHIO

Western Sales Representative: J. Curtis Barcus, Farina, Ill.
Liberal terms to dealers.

No matter what spark plugs automobiles are equipped with originally

"SOOT-PROOF"

plugs will eventually replace them. Naturally, price plays an important part with some manufacturers, but Quality alone interests the user. There are scores of cheaper spark plugs on the market—there always will be some manufacturers who will make goods to fit the price.

There is no spark plug in the world worth more than \$1.00, which is the SOOT PROOF price.

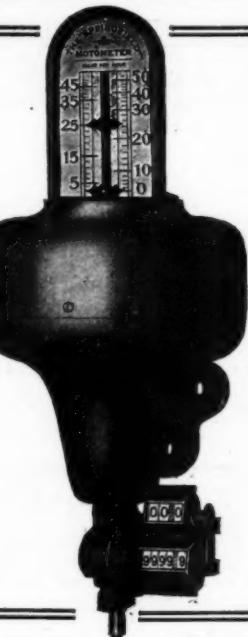
Insist that your car is equipped with them.

The genuine bears the name of C. A. Mezger on the porcelain.

C. A. MEZGER, Inc., Manufacturers
1759 Broadway, New York

National Sales Corporation, Factory Sales Managers
296 Broadway, New York





A LITTLE PLAIN TALK ABOUT SPEEDOMETERS

The opening of the 1908 season presents an unusual crop of perplexities to the prospective buyer of a speedometer. Heretofore the main point for decision was, "Which of the three or four good instruments on the market is best adapted to my use?" This is now considerably complicated by the presentation in new form of the ever-green illusion, "SOMETHING FOR NOTHING." This proposition dates back at least to the Stone Age and has occupied some of the world's brightest minds. As applied to speedometers, it takes the form of the offer at very low prices of speedometers for which the most extravagant claims are made.

Now the speedometer proposition is NOT essentially different from any other involving the manufacture of fine mechanism. No magic has been evolved by which five dollars will do the work of twenty in paying shop costs, selling expense and stock bills.

A watch is a good comparison. You can buy one for one dollar. It will give you a BIG dollar's worth of service. It is backed by an elaborate guarantee. **BUT YOU DON'T FIND THE DOLLAR WATCH IN THE POCKET OF THE RAILROAD ENGINEER.**

It is so with speedometers. The prime essential is ABSOLUTE RELIABILITY and ACCURACY. The railroad man buys his timepiece on the REPUTATION of the maker and the timepiece. The same rule is pretty safe in buying a speedometer, or anything else.

On this basis we submit the MOTOMETER FOR 1908. What it HAS DONE is a matter of history. What it IS DOING can be ascertained by any interested man or woman. What it WILL DO is therefore NOT a matter of FAITH, but of EXPERIENCE.

It is even more moderate in price this season than before, and the reduction is logical. We have NOT been obliged to make changes to overcome faulty design or construction. It is absolutely accurate and dependable, as it has always been. No instrument made has equalled its record in real service tests. It is beautifully made and beautifully finished, absolutely nothing being sacrificed to reduce cost. It contains EVERY refinement, including maximum speed hand, special easy-reading dial, reinforced driving shaft and self-cleaning pinion. A thoroughly high-grade instrument with four seasons of successful service behind it and backed by our thirty-odd years' reputation as makers of the best in our lines. Like EVERYTHING WE MAKE it carries our FULL AND ABSOLUTE GUARANTEE, but this does NOT constitute its sole merit.

Our 1908 catalog sent on request. You will find it interesting. 1908 models and prices.

The 50 Mile Model, \$35.00. The 60 Mile Model, \$40.00. The 100 Mile Model, for High-Power Flyers, \$50.00.

Maximum Speed Hand, on any model, \$5.00 extra.

THE R. H. SMITH MFG. CO.

SPRINGFIELD, MASS.

Established 1865

Incorporated 1883

BRENNAN 1908 MOTORS AND TRANSMISSIONS

Brennan Motor Mfg. Co., Syracuse, N. Y.

Gentlemen: We are in receipt of your valued favor of the 15th in regard to the Brennan Motor which we have in our Wayne car.

Will say in reply that we are very much pleased with the way the engine has worked and since putting it in this car we have had one of the most powerful and best working cars that we have ever seen. The motor did not give us one minute's trouble all last season and we could certainly recommend it to anyone who has a Wayne Light touring car. Our engine is in first class condition now and we will need no repairs for it. Yours truly,

Progressive Mfg. Co.

2 Cyl. Motors 12 to 24 H.P.

4 Cyl. Motors 20 to 80 H.P.

Motors and transmission gears furnished complete on sub-frame or pressed steel frame. Four and six-cylinder chassis from 28 H. P. to 80 H. P., built to order. Write to us—all correspondence promptly answered.

BRENNAN MOTOR COMPANY, Syracuse, New York

NOW IS THE TIME TO TAKE UP THE QUESTION OF MOTORS AND TRANSMISSIONS FOR NEW CARS OR REBUILDING OLD ONES



The Practical Gas Engineer

What It Is and How To Do It. A book of 150 pages neatly bound in cloth. Sent postpaid for \$1. Address Book Department, The Automobile, Flatiron Building, New York.



AUTO FRONTS AND TOPS

COL. SPRAGUE'S NEW 1908 COMMON SENSE GOODS for SENSIBLE PEOPLE

A gentleman's outfit. One in one, that's all. We kill the bugs—we don't catch 'em and hold 'em. They are fool proof. No set screws. No plunge bolts. No other rattle traps or monkey shines.

Simplicity, Durability and Elegance

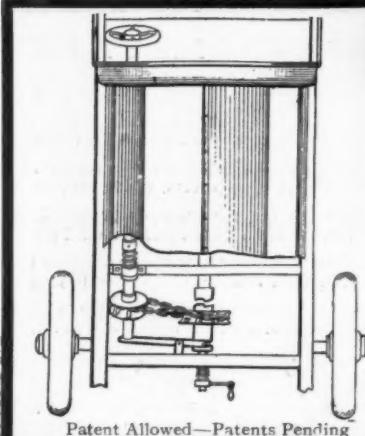
ALL THE WORKING PARTS MADE OF PHOSPHOR BRONZE AND CAN'T BREAK

Ask for our catalogue and price list

The Sprague Umbrella Co. Norwalk, O.



The Only Front That Can't Rattle.
Because It's Made That Way.



Patent Allowed—Patents Pending

NO MORE CRANKING!

The Adams Engine Starter

Absolutely the only successful automatic automobile engine starter on the market. Operates from the seat, completely eliminating all danger of "kicking" and accidents from cranking. Can be operated by women as well as men as only one quarter the amount of energy is required in starting the engine as by the cranking device. Greatly adds to the salability, utility and safety of automobiles. Detailed drawings to automobile manufacturers on request, or will send man to demonstrate.

PRICE, \$25.00

Agents Wanted Everywhere Write To-day

**THE ADAMS
AUTOMOBILE STARTER CO.**
429 Wabash Avenue CHICAGO

THIS LETTER TELLS IT ALL

CHICAGO, 2-10-'08.

Dear Sir:

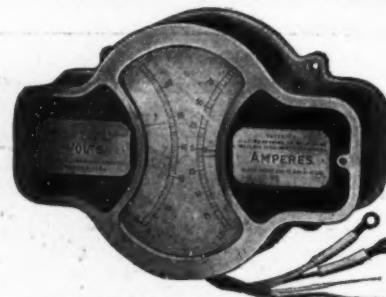
I am so well pleased with your starter that I have decided to tell you about it. I have been using it for the past three months and it has not failed to do the work once. I came very near having my arm broken several times by having my crank kick back before I had my starter placed on my car.

I consider it one of the most important inventions in the Auto business, and would not for one moment be without it.

I am sure you have the heartfelt thanks of every one that is interested in the Automobile business, and predict your starter will in time be on 90 per cent. of the cars.

Wishing you success, I remain yours very truly,
H. R. COIT,
5929 Calumet Avenue,
Chicago
Phone, Garfield 3736.

WESTON ELECTRICAL INSTRUMENT CO.

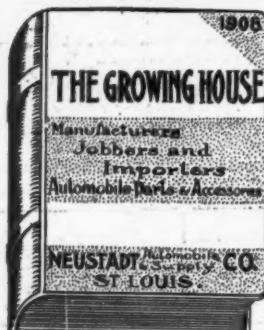
Combination Volt and Ammeter
Model 39

Electrical Measuring Instruments

FOR USE IN
Electrical Carriages and in Charging Stations

Send for Catalogue

Main Office and Works, Waverly Park, Newark, N. J.
New York Office, - - - 74 Cortlandt Street

Switchboard Instrument
Model 24Our 1908 Catalogue, 200 Pages, over
2000 illustrations and 6000 descriptive
quotations, yours for the asking

The Largest Parts and Supply House in America

EVERYTHING FOR THE AUTOMOBILE AND AUTOMOBILISTS

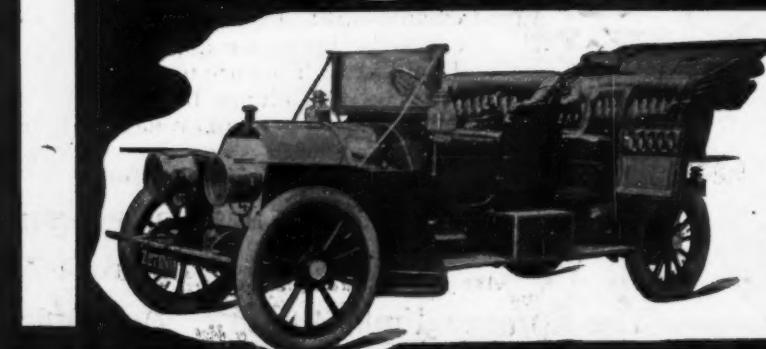
Manufacturers,
Distributors
and Jobbers

AUTOMOBILE PARTS AND ACCESSORIES

Neustadt Automobile & Supply Co.
"THE GROWING HOUSE"
3954 Olive Street ST. LOUIS, MO.



TINCHER GUARANTEED AUTOMOBILES



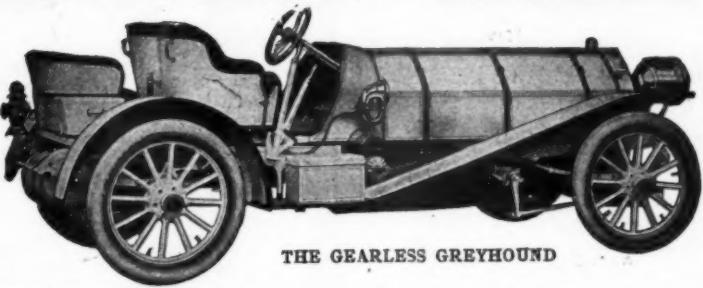
A car up-to-date in every modern style and improvement a car possessing all the points that promote all-the-year-round satisfaction.

Price, \$6,500
and worth every cent of it.
Write for full particulars
Tincher Motor Car Co.
SOUTH BEND, INDIANA
Chicago Branch:
Chicago Auto. Club Building



THE GEARLESS GREYHOUND

"The Thoroughbred Roadster" sets a new record for RELIABILITY in THE NEW YORK TO PARIS RACE. As pilot car for both The Chicago and Rochester Automobile Clubs, SETTING THE PACE AND BREAKING THE ROADS for the Zest from GENEVA, N.Y., TO THE MISSISSIPPI RIVER—this WITHOUT A MOMENT'S NOTICE AND WITHOUT REPAIRS.



THE GEARLESS GREYHOUND

WRITE FOR CATALOGUE

AGENTS WANTED IN UNOCCUPIED TERRITORY

Two Models

6 cyl. 75 H.P. - \$4,000
4 cyl. 60 H.P. - 3,500

GEARLESS TRANSMISSION COMPANY, Motor Car Dept., ROCHESTER, N. Y.

APPERSON

WINS

More than a lap ahead of its only competitor in the Light Stock Car Race at Savannah, Ga., March 18th

This performance of our Model M Roadster, price \$2,750—proves APPERSON low price cars UNEQUALLED IN QUALITY and the GREATEST VALUE THE WORLD HAS EVER PRODUCED. NOWHERE CAN YOU MATCH THIS: A car finished throughout of the best materials, equipped with 2 independent sets of ignition—folding top—five lamps and generator, horn and full set of tools; a car with quick detachable rims on wheel and standard tires; a car rated at 24 H. P., but that will develop 40 H. P. All the above and more for \$2,750.

IN THE 360 MILE SOUTHERN CUP RACE

The Apperson "Jack Rabbit" took second place, beating some of the best cars built.
Quality is what counts in the long run.—Buy "Apperson" and you buy "Quality."
APPERSON BROS. AUTOMOBILE COMPANY, Kokomo, Indiana

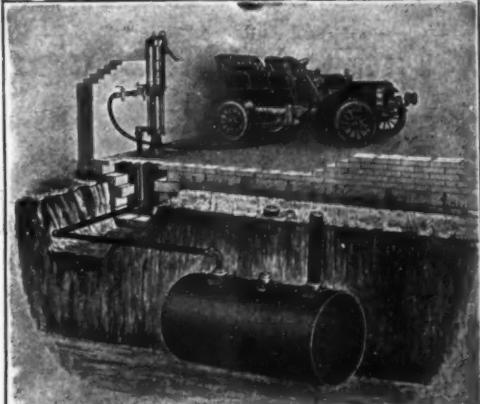


THE QUESTION OF COST

It is not a question of how much it will cost you to buy a Bowser Gasolene Tank, but rather how much it is now costing you to be without one.

Write for Catalog J. It will show just how you have lost enough money to pay for a Bowser many times over.

S. F. BOWSER & CO., Inc., Fort Wayne, Ind.

255 Atlantic Ave.,
Boston299 Broadway,
New York200-10 Fisher Bidg.,
Chicago66-68 Frazer Ave.,
Ontario

Cut 41—Long Distance Outfit, The Standard Garage Equipment for Gasolene Storage.

\$2,500 \$3,000 \$3,750

HAYNES

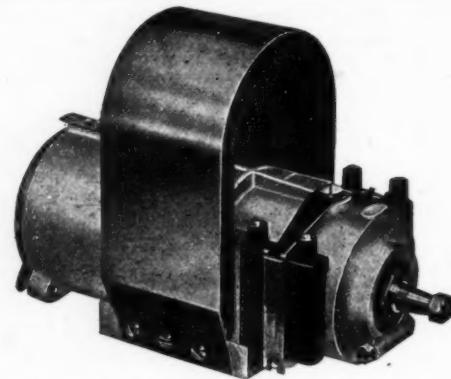
Kokomo, Ind.

Thousands of skilled engineers and brilliant inventors have contributed to the ideas required to produce the present "TYPE" of Autos.

We have contributed our share of these ideas. We do not claim credit for the "TYPE," but we do claim to be the first to recognize its existence and the desirability of adhering to it.

The Garford is intended to be, and we believe IS, a well executed realization of the generally accepted "TYPE" of automobile representing the best judgment of those qualified to judge.

ADDRESS:
 Eastern Inquiries
 Garford Motor Car Co. of New York
 1540 Broadway, New York City
 Western Inquiries
 Garford Motor Car Co. of Cleveland
 1372 East 12th St., Cleveland, O.



The HOLLEY High-Tension MAGNETO

TAKES THE PLACE OF BATTERY, COMMUTATOR AND SPARK COIL
PRICE, \$65.00

Magneto is guaranteed to perfectly meet the ignition requirements of any four-cylinder motor.

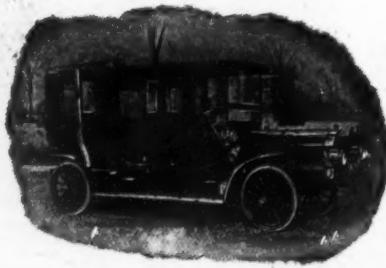
Guaranteed free of repairs for one year and is sold on condition that it may be returned and money refunded at any time within thirty days from date of sale.

Fittings supplied at cost for attaching magneto to the following cars:
 Buick, four-cylinder, Model X Pope-Toledo, 1906
 Ford Runabouts Stoddard-Dayton, '08 four-cylinder
 Maxwell, 1908 four-cylinder Thomas Flyer, 1906
 Olds 1906, 1907 and 1908 Thomas Forty, 1907 and '08 Models
 Pope-Hartford, 1907 and 1908 Wayne, 1907 and 1908
 Winton, Models A, B, C and K

HOLLEY BROTHERS CO., Detroit, Mich.

The Auto Car Equipment Co.

Make the Highest Powered
 Limousines in the
 Market



6-Cyl., 60-H.P., Seating 7 to 10 People. Elegant, Luxurious.

Also Manufacturers of

Trucks, Omnibuses and Sight-
 Seeing Cars—Gasoline and Electric

ADDRESS

THE AUTO CAR EQUIPMENT CO.
 87 Edward Street, Buffalo, New York

Ormond - Daytona Beach Races

MARCH 3, 1908

160-MILE STOCK CHASSIS RACE

1st Benz—80 Horse Power
 2d CLEVELAND (Pathfinder) 40 Horse Power

Other Entrants:
 Packard, Haynes, Thomas, Christie and Allen-Kingston

NOTE—Benz protested owing to being over-weight and excessive cylinder displacement. The CLEVELAND that did this is the same car that a week before finished the Jacksonville-Miami 371 Miles Endurance Run through trackless Florida swamps, sand barrens and turpentine woods, in 5 days, carrying 1,000 pounds of baggage and five passengers. This without a breakdown or a replacement of any kind beyond a broken front spring, and you can buy the same kind of a car for

\$3,500

The Cleveland Motor Car Company

1659 Broadway, New York City

Philadelphia Branch
 236 North Broad Street

Chicago Branch:
 1218 Michigan Avenue

Factory: Milwaukee, Wis.



Equip Your Car
with a
**HEDGELAND
EQUALIZER**

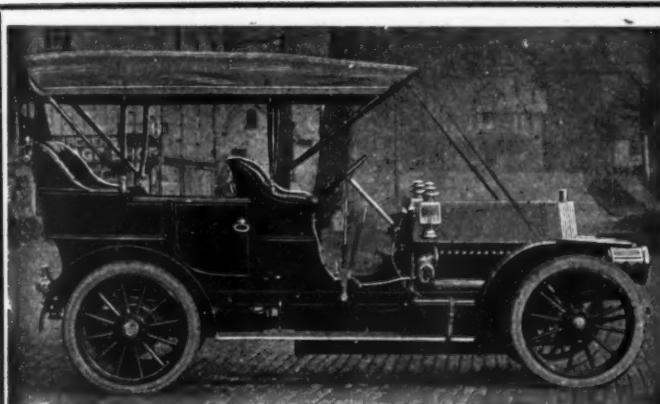
Any skidding that ever happened is due solely to the differential gears allowing the car to pivot on one wheel and get beyond the control of the driver. The *HEDGELAND EQUALIZER* absolutely drives both wheels and gives the driver a positive braking effort on both wheels. It is interchangeable with the differential gears in the following cars:

Auto Car.	Knox.
Buick.	Knight & Kilbourne Co.
Blomstrom.	Moline.
Conover Motor Car.	Mora.
Deere-Clark.	Med-Bow Automobile Co.
Diamond "T" Motor Car.	Nordyke & Marmon Co.
Dorris Motor Car.	Olds Motor Works.
De Luxe Motor Car. (Queen.)	Premier.
Elmore.	St. Louis Motor Car Co.
Jackson.	Stevens-Duryea.
York Motor Car Co.	Thomas, E. R., Detroit Co.

If you are buying a new car, *insist* upon it; if you already have a car, make the change. It's a life saver, tire saver, a nerve saver and a power saver.

Owners, Garages. Write us for our *Book of Indorsements* which contains definite data in regard to our device.

HEDGELAND MFG. CO.
CANTON, OHIO



JEWEL Touring Car

Price, \$3,000.00 complete

Specifications:

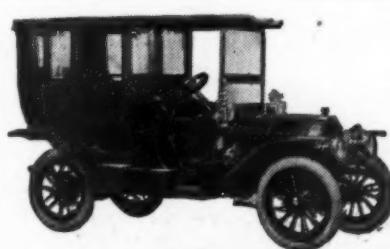
Motor	Rutenber 4-cylinder
Bore and Stroke	4 $\frac{1}{2}$ " x 5"
Ignition	Double Bosch Magneto, Coil and Battery.
Transmission	Selective Type.
Wheel Base	117".
Tread	56".
Wheels	36".
Tires	16" x 4". Any make.
Body	Touring. Seats for seven passengers.

The Forest City Motor Car Company
136 Walnut Street, Massillon, Ohio

The Autocar

The Type XIV Limousine at \$3,750, including touring car body, is an extremely attractive proposition. It furnishes a luxurious car for town and winter use and a five passenger touring car for the spring and summer.

RUNABOUT, including lamps and top, 12 H. P. \$1200
TOURING CAR 30 H. P. 2750
LIMOUSINE, including touring car body, 30 H. P. 3750



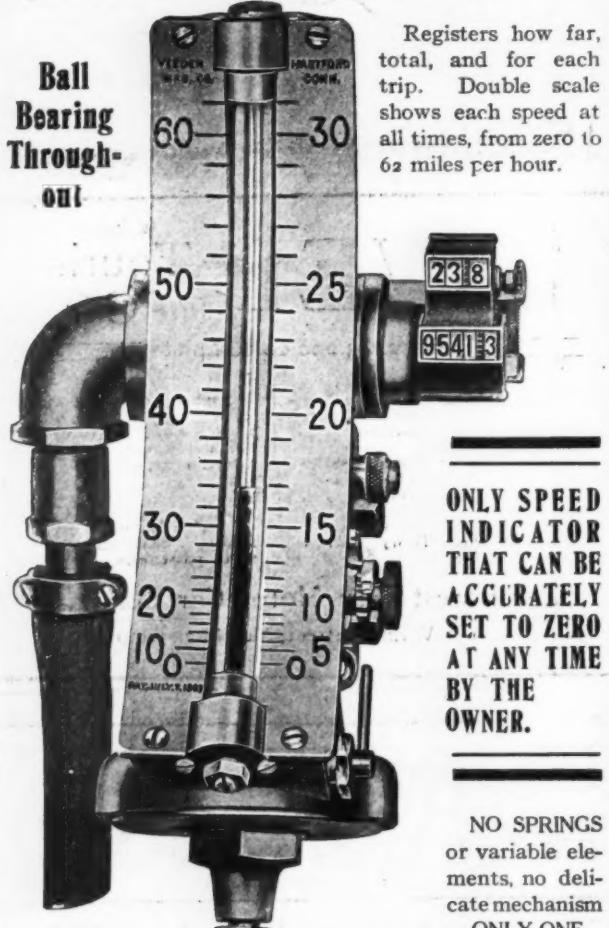
Write
for 1908
Catalogue

The Autocar Co., ^{Member} A. L. A. M. Ardmore, Pa.

"It's nice to know how far you go;
And this will show the Speed,—also."

Veeder
(TACHODOMETER)

Ball
Bearing
Through-
out



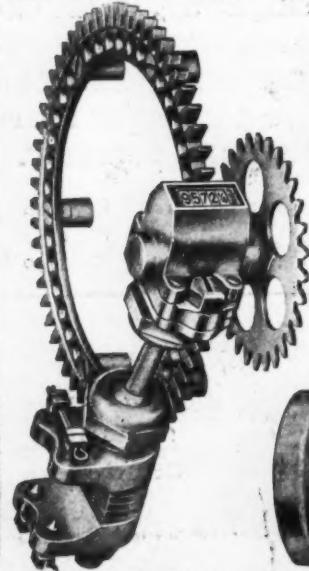
Price, complete, ready to put on any car, \$75.00

NO SPRINGS
or variable elements,
no delicate mechanism
—ONLY ONE
MOVING PART

Thousands of Veeder
Odometers in use to one
of any other make.

The Veeder Mfg. Co.,

Sargeant St.,
HARTFORD, CT.



FORM B ODOMETER
Complete, ready to put on
any car, \$10.00

FORM D or DASHBOARD ODOMETER
Complete with flexible shaft and attaching
fixtures, ready to put on any car, \$20.00

82 MILES AN HOUR WITH Bosch Magneto

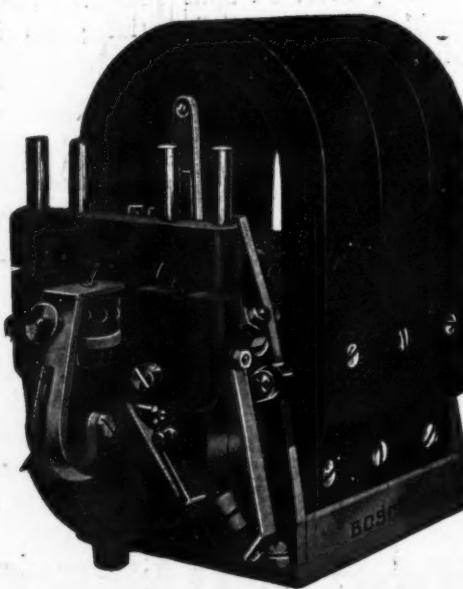
At Ormond, March 6th, Bernin driving
Renault Car won 100 mile race equipped
with Bosch Ignition System.

Mile in 35 Seconds with Bosch Magneto

Fiat Car driven by Cedrino on same day made new world's record for middle weight machines. Fiat also equipped with Bosch Ignition System.

MOST RELIABLE IGNITION SYSTEM IN THE WORLD

BOSCH MAGNETO CO., NEW YORK, INC.
160 West 56th St. New York



Matheson



One Year Guarantee

The technical opinions of the best critics of Europe and America, reviewing the general tendencies of automobile construction in the world's leading cars, are given in a book we have just published and which will be sent to any address upon request. This book gives also some unusually interesting letters of prominent men of affairs who tell in their own words of the exceptional service qualities of their Matheson cars. These letters are especially instructive, as their authors represent the most experienced class of buyers, who have in many instances abandoned their foreign cars for the Matheson.

Dealers

are wanted in all localities where Matheson cars are not now represented—write for our very attractive dealer's proposition.



**Matheson
Motor Car Co.,**

Makers

Main Office and Factory, WILKES-BARRE, PA.

(Licensed Under Selden Patent)

Have you Heard from Florida?

The single cylinder Cadillac driven by Dr. W. N. Stinson won the Jacksonville to Miami endurance run, 371 miles over some of the worst roads in the country, beating its closest competitor by 75 miles.

The other contestants were two and four cylinder cars.

A telegraphic report from Palm Beach, Fla., under date of March 15th, and printed in the *New York Tribune* of March 16th, says:

"Nevertheless the route laid over a course that offered almost every kind of obstacle for a contest of its kind, and the highest praise is deserving of the 10 H.P. Cadillac driven by Dr. W. N. Stinson, of Jacksonville, which came in first in the actual running time of 30 hours and 18 minutes."

The *New York Evening Post*, under date of March 13th, prints the following telegram from Miami, Fla.:

"MIAMI, FLA., March 13.—Dr. William Stinson finished the Florida road race to-day at noon, *fully seventy-five miles in advance of his nearest competitor*. His official running time for the 371 miles was 37 hours 19 minutes; his actual running time being seven hours shorter. He drove a 10 horsepower Cadillac runabout, which carried three persons."

Cadillac Wins Three Prizes in One Contest

The *New York Globe* says, March 13:

"Dr. Stinson's Cadillac is in Class B and wins the Fort Pierce cup, the first prize in this class, also the Palm Beach cup for the car in this class that made the fastest time between Fort Pierce and Palm Beach. The Miami trophy also goes to the Globe car (Cadillac) because it made the best all-round showing on the whole run, irrespective of power."

**Cadillac Motor Car Co.
DETROIT, MICHIGAN**

Member of Association Licensed Automobile Manufacturers

*A wee bit more in price, but
O, what a difference in the wearing!*

FISK TIRES

SAVE DOLLARS; SOMETIMES LIVES

FISK Mechanically Fastened Tire

The Only One in the World That Cannot Be Accidentally Pulled from the Rim

Fisk Standard Clincher } New products, made for all rims
Fisk Quick Detachable } Fisk Quality

THE FISK RUBBER COMPANY, Chicopee Falls, Mass.

Branches in all principal cities

NO
SKIDDING

NO
PUNCTURES

SAMSON

“TYPE COURSE” “SAMSON RUBBER”

“SAMSON TUBES”

MADE IN FRANCE

KING OF TIRES—TIRE OF KINGS

SAMSON LEATHER TIRE CO.

1634-1642 Broadway, New York

G. DE PONTAC, General Manager

NO
RIM-CUT

AGENCIES:

AUTO SUPPLY CO., BOSTON. W. SANFORD & CO., PHILA.
 J. B. McKEAGUE, CHICAGO. DUPONT GARAGE, WASH., D. C.
 J. J. GRIFFIN, PITTSBURG. F. O. SAWYER, ST. LOUIS, MO.
 and other leading cities.

NO
BLOW-OUT

ELOQUENT TESTIMONY ON BEHALF OF THE



You might be inclined to discount somewhat our enthusiasm over the ELMORE—but who can fail to be impressed by such eminent testimony as is contained in the subjoined letter?

NEW YORK CENTRAL & HUDSON RIVER R. R. CO.,
GRAND CENTRAL STATION,

MESSRS. A. ELLIOTT RANNEY & CO.,

New York, N. Y.

NEW YORK, January 10, 1908.

Gentlemen: After adequate experience with an Elmore four-cylinder car, I am constrained to express my belief as follows:

1. That the two-cycle engine has marked superiority for the general classes of automobile vehicles.
2. That your engine, transmission and ignition systems are pronounced and practical successes.
3. That the immediate future will probably give you some sharp competition from two-cycle vehicles made by many of the manufacturers of the four-cycle types.

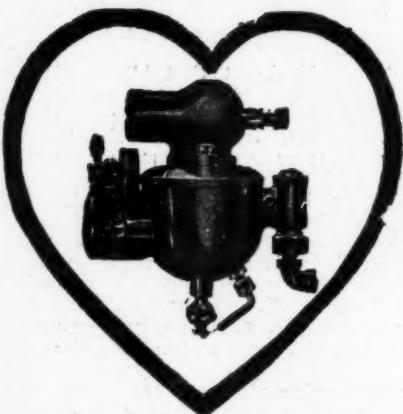
You have the advantage in simplicity, power application, maintenance, operation for sane purposes, and useful life of machine

Yours truly,
(Signed) H. L. INGERSOLL, SPECIAL ENGINEER.

THE ELMORE MFG. CO., 1304 Amanda Street, CLYDE, O.
MEMBERS A. L. A. M.

THE SCHEBLER CARBURETER

STANDARD OF THE WORLD



Eliminates every Carbureter Trouble.
Adopted by the leading American car builders and
endorsed by users everywhere.

We own and operate the largest factory in the world devoted exclusively to the manufacture of Carbureters. Capacity 20,000 Carbureters a Month. We can take care of the Carbureter business of the world. Orders filled same day they are received.

WHEELER & SCHEBLER, MANUFACTURERS
Factory: Indianapolis, Ind.

SALES OFFICES

F. J. ALVIN, Mgr.
233-237 Randolph St., Chicago

NEW ENGLAND OFFICE

W. J. CONNELL, Mgr.

36 Columbus Ave., Boston, Mass. The Motor Mart, 62nd and Broadway, N. Y.

EASTERN OFFICE

E. J. EDMOND, Mgr.

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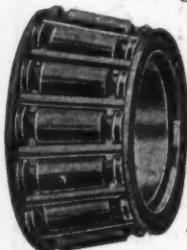
EXCELSIOR SUPPLY CO., Exclusive Agents for Chicago and Cook County, Ill.
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Correct Principles and Supreme Quality

are embodied as proven by trial and test, by a very large majority of builders of high grade American Automobiles and Auto Trucks who are equipping their product year after year with

Timken Roller Bearings

¶ Their use does away with friction, distributes the weight and strain—provides for end thrust as well as side load and carries the weight easier and farther at less expense than any other bearing made.



¶ And this is why over **60%** of the makers of high grade Automobiles and **90%** of the Trucks built in this country are equipped with

Timken Roller Bearings

¶ They are made under test and sold under a guarantee of **two** years. You take no chances or run no risk in equipping your product with them.

¶ If a doubter, drop us a line. We will give you facts based on figures.

The Timken Roller Bearing Axle Company, Canton, Ohio

Branches: 10 East 31st Street, New York 429 Wabash Avenue, Chicago



Story of the Four Viziers

WHEN Haroun al Raschid became Caliph, he sent four of his viziers to search everywhere for the maiden most worthy to be queen. In two months they returned to report.

Said the youngest, "O Caliph, I found in Bussorah a manicurist of the most ravishing graces imaginable. Her skin resembles lilies and roses, her hair is like burnished copper, her features are like chiseled marble, and her stature and bearing are those of one born to command."

"Didst thou speak with her, to learn whether her mind were on a par with her outward charms?" asked Haroun.

"Nay," said the other, "for the crowd of Johnnies was too great. But who could doubt that Allah had favored her thus also?"

Then spake the second: "Your Majesty, I found in Damascus the most charming damsel mine eyes have even beheld. Her face and form are perfect, and her voice is like the music of many fountains. She hath, moreover, a sprightly wit and a most pleasing manner. This I know, for she dances and sings nightly in the Damascus Opera House, where I have had a box stall these seven weeks."

Then spake the third: "Your Majesty, I recommend Fatima, only child of Hassan, President of the Bagdad Life Insurance Co. The splendor of her raiment is the talk of Bagdad, and she will inherit whatever of Hassan's wealth the investigating committee leaves untouched."

"And thou, Abdallah," said Haroun to the fourth, "thou alone of the four art married; is thy report like the others?"

"O Caliph," replied Abdallah, bowing, "I have found in a small village a damsel well worthy of thy royal consideration. She is versed in all womanly accomplishments, and is beloved by all for her good deeds. Her face bespeaks dignity, patience, and a cheerful heart. She is the daughter of a ropemaker, who is crippled, and for many months she has nursed him with tenderest care."

"Thanks, worthy Abdallah!" said Haroun. "I perceive that thou knowest wherein happiness lies, and that when one chooses a helpmeet for life, there is no substitute for true worth. For thy discernment thou shalt receive a thousand pieces of gold. As for you, my friends," said he to the other three, "I give each of you leave to marry the damsel you have proposed for me. And if within a year you do not thereby acquire wisdom, it will be because there is no hope left for you."

A good lamp, like a good wife, never grows dull. The owner of a Rushmore has no regrets



RUSHMORE DYNAMO WORKS *PLAINFIELD, N. J., U.S.A.—LONDON, PARIS, CHICAGO*

1908

ZIMMERMAN AUTO RUNABOUT

MODEL F



A HIGH GRADE RUNABOUT AT MEDIUM PRICE

Very simple, strong, reliable and economical, with 12 H.P. Air Cooled Motor (under hood), 78 inch wheel base, 36 inch artillery type wheels with 1½ inch solid rubber tires and a double disc friction drive. It stands alone as the PEER in the field of RUNABOUTS. Write for Circular No. 9, which will tell you more about it.

ZIMMERMAN MANUFACTURING COMPANY,

AUBURN, Indiana

The AMERICAN



'08-50 ROADSTER, \$3,750

RAPID SALES FOR HONEST AGENTS

AMERICAN cars are rapid sellers because they are honest in every particular—design, materials, workmanship and price. They are the equal of any car built, and we can prove it. Do you not think it would be easier to sell a six thousand dollar car for \$3250 or \$3750 than to ask the full price? That is exactly what you do when you sell AMERICAN cars. Special concessions on our 40 demonstrating models for a short time. Write to-day for catalogue and particulars.

40 Roadster, 40-50 h.p.	\$3250	50 Roadster, 50-60 h.p.	\$3750
40 Tourist, 40-50 h.p.	\$3250	50 Tourist, 5-Passenger	\$3750
50 Tourist, 7-Passenger	\$4000		

AMERICAN MOTOR CAR SALES CO., Factory Sales Agents, Indianapolis, Ind.

GROUT

CARS FOR 1908

Good from Steel Bar to Finished Car. Thoroughly Reliable, High Grade Automobile. Equipped in the Best Style. Possessing Strength and Flexibility for a Very Moderate Outlay. Easily Controlled, Fuel Consumption Low, and is Remarkably Easy on Tires. 4 Cylinder, 35 H. P. Complete with Top, Headlights and Generator, \$2,500.

We Invite Inquiry and Comparison.

Grout Bros. Automobile Co., Orange, Mass.

ESTABLISHED 1896

We built the first factory in this country for the manufacturing of motor cars.

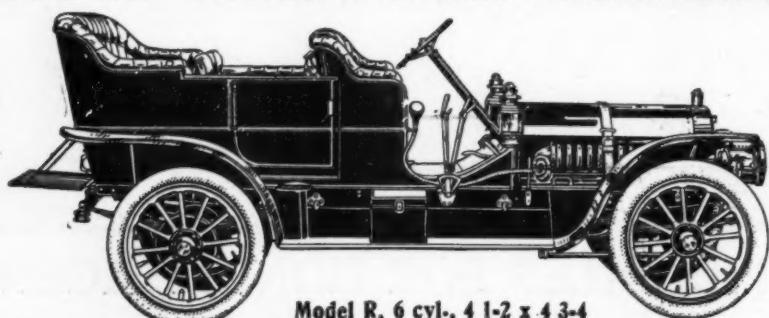
National

The Pioneer AMERICAN Six Cylinder Stock Car

National Sixes are a revelation in smooth running and easy riding qualities and are built of the best material money can buy

Model K, 4 cyl., 4 7-8 x 5
\$3,500.00

Model N, 4 cyl., 5 x 5
\$3,700.00



Model R, 6 cyl., 4 1-2 x 4 3-4
\$4,200.00

Model T, 6 cyl., 5 x 5
\$5,000.00

Model R, 6 cyl., 4 1-2 x 4 3-4

WRITE FOR DETAILS

NATIONAL MOTOR VEHICLE CO.
1000 East 22d Street, INDIANAPOLIS, IND.





Price \$1,850.

HERE AT LAST IS A TAXICAB THAT WILL STAND THE RACKET

The Taxicab idea has caught on. Swift, silent automobile cab service, pay for what you get, pleases the American public.

But up to now the American motor car manufacturer has failed to see this opportunity. Foreign-built cars have been used freely in Taxicab service—not because they are better nor because they are cheaper—simply because the foreign builders saw the opportunity first.

The makers of the Oakland car have grasped the situation and have produced, ready for immediate delivery, a Taxicab that is better adapted in every way for this class of service, both from the standpoint of satisfaction

to the customer and economy and earning power to the operator.

THE PRICE IS \$1,850. Look at the illustration, which is from an actual photograph, and you will partly understand what an unusually low figure this is for a dependable car. The gas lamps and generator are not included in the price.

This car weighs but 1,800 pounds as against 2,800 to 3,000 pounds in cars of equal capacity and power now used for Taxicab service.

This great reduction in weight means a great reduction in cost of operation, maintenance, repairs, and tire wear.

THESE FEATURES MAKE THE OAKLAND TAXICAB SUPREME

The reduction in weight is achieved without lessening the **STRENGTH OR EFFICIENCY.** It is obtained by the use of a wood trussed frame, a 20-H. P., two-cylinder, perfectly balanced, vertical motor, as smooth running but lighter than the bulkier four-cylinder motor and the free use of aluminum throughout the entire machine. Fewer parts mean lighter weights, less cost and less chance of troubles and repairs.

Instead of selective and sliding gear transmission, ordinarily seen in Taxicabs, we use a new type of planetary transmission of our own design, giving two speeds

and reverse, all controlled by one lever—enclosed in aluminum housings, runs in oil, requires no attention or adjustment. Absolutely fool-proof.

We have evolved a smooth running two-cylinder motor that gives ample power without vibration, and has all the advantages of a four-cylinder construction with less parts, fewer adjustments and less weight, all of which means economy of upkeep.

IF YOU ARE INTERESTED IN THE HIGHEST TYPE OF TAXICAB YET PRODUCED IN THIS COUNTRY WRITE US AT ONCE FOR ALL FULL DETAILS.

OAKLAND MOTOR CAR CO., Pontiac, Mich.



Get Ready Now for Spring Tours
**JOHN BOYLE
TRUNK**

An Essential Equipment to Every Car
 Its Convenience is Inestimable

With a JOHN BOYLE TRUNK

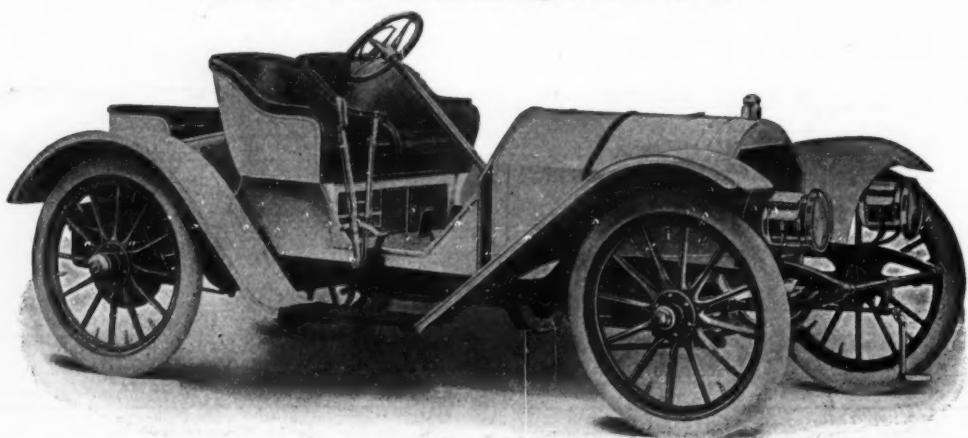
You can carry all requirements of clothing and other necessities for your family and self in one roomy, safe, sure—under lock and key—water-proof and dust-proof trunk, strapped out of your way at the rear of the car. Easily opened en-route. At your destination unstrap from car and send into your rooms. Gives pleasure, comfort and satisfaction to all tours and a finer appearance to your car. You are always ready for any emergency, regardless of weather changes or stop overs en-tour.

In CAPACITY, ACCESSIBILITY, RELIABILITY, DURABILITY, UTILITY and ECONOMY, JOHN BOYLE TRUNKS excel all others—no other trunks possess these features to such a satisfactory degree. Of original design, smart and distinctive appearance, special construction, they are made with a view to real hard wear and to adequately meet the strains put upon them in traveling. They wear almost indefinitely. Write for Style Book and Prices for the various makes of cars.

JOHN BOYLE & CO., 112-114 Duane St.
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IMPERIAL ROADSTER

The Car with the Straight Line Drive



30-35 H. P., 36" wheels, selective type transmission, Eisemann Magneto, double system of ignition, double drop frame. Price including gas lamps and generator, horn, tools, etc., \$2,500.00.

IMPERIAL MOTOR CAR CO., WILLIAMSPORT, PENN., U. S. A.

Members A. M. C. M. A.

Are You Quite Satisfied ?

Imported
Die
Forgings

Chrome Nickel Steel!
Chrome Vanadium Steel!
Special Auto Steel!

For All
Automobile
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COST LESS THAN CASTINGS IN THE FIRST PLACE!

Round
Bars
All
Sizes

Chrome Nickel Steel!
Chrome Vanadium Steel!
Special Auto Steel!
Special Gear Steel!

Mill Lengths
or cut off
to suit
Purchasers

DO NOT HANDLE INFERIOR STEEL AT ALL!

Designs
and
Drawings

Of Motors, Transmissions,
Chassis or of other
parts of cars

Made
to
Order

AT A FIXED PRICE, FOR GUARANTEED WORK!

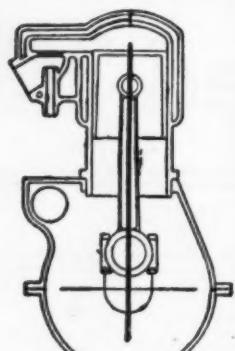
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To the investigation of
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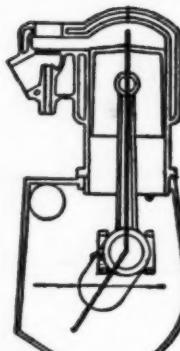
Fearless
Honest
Opinion

A STITCH IN TIME SAVES NINE!

J. M. ELLSWORTH, AUTOMOBILE ENGINEER 30 Pine Street, New York



Crank Shaft on Center



Crank Shaft Offset

Rambler

Why the Offset Crank Shaft

One of the greatest improvements in motor construction is the offset crank shaft. Its advantages are positive and direct:

First—By practically eliminating the dead center the efficiency of the motor is greatly increased through the greater leverage and more direct thrust from piston to crank shaft.

Second—Increased life of the motor through reduction of side thrust on cylinder walls and consequent saving in wear.

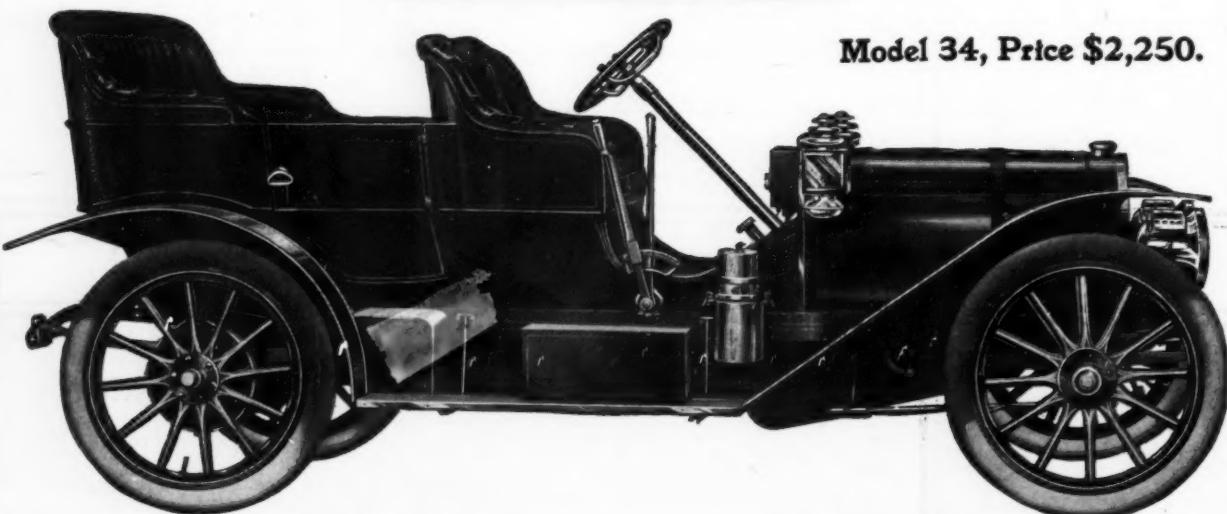
Third—Reduction in vibration and increased steadiness of running through more direct application of power generated in the cylinders.

Like many other fundamentally good features this must be done right and in the Rambler it is right both theoretically and practically and the result is a motor that combines the highest degree of efficiency with long life and economy of operation.

It is this and other features of equal value that make

The Car of Steady Service

Model 34, Price \$2,250.



This four cylinder chassis, equipped both as a 5-passenger touring car and 3-passenger roadster.
Price of each style, \$2,250. The Rambler Utility Car with double opposed motor, \$1,400.

Thomas B. Jeffery & Company

Main Office and Factory, Kenosha, Wisconsin.

Branches and Distributing Agencies:

Chicago, Milwaukee, Boston, Philadelphia, San Francisco.

Representatives in all leading cities.

FRANKLIN Automobiles

Is air-cooling practical? What does it do? What is the benefit?

Nobody ever questioned that if air-cooling will cool it is the ideal method. But the question still comes up "Will it cool?" Look into that fairly—

Last August a Franklin Type D automobile ran from Chicago to New York in less than forty hours, cutting the water-cooled record 18 hours 50 minutes.

A machine could not be "coddled" and make that record. It must be driven hard. In fact, this Type D beat the express train that carried the relay drivers between three of the stops, else the record would have been cut still further.

The 15-day run of a Franklin Type H automobile from San Francisco to New York in August two years ago is also still untouched.

The Franklin D engine ran seven days without stopping, in a hot Chicago salesroom, and again at Cincinnati it ran eighteen days, 3,312 miles over bad winter roads. In this run the Franklin motor was kept going every minute and only stopped finally when the emergency brake was pulled by mistake.

Finally, 5,328 Franklin automobiles are in daily use.

Can anyone doubt that Franklin air-cooling is completely practical?

You gain simplicity. Water-cooling is a complicated system. It increases the liability to trouble. If the water boils there will be over-heating. This can't happen to the Franklin motor. The temperature is more constant and more efficient. It gets more work out of the gasoline. You save the extra weight of water-cooling apparatus. The power is not handicapped. It can do more. And with the Franklin shock-absorbing construction the power can always be comfortably used. The operating expense is light; and you get all the benefit of it.

No other automobile weighing under 2,000 pounds will do the work of the Franklin family touring-car Type G, which weighs only 1,600 pounds.

No automobile but a Franklin will carry five people as far in a day as the Franklin five-passenger Type D; yet it only weighs 2,200 pounds. The average five-passenger automobile weighs a third more.

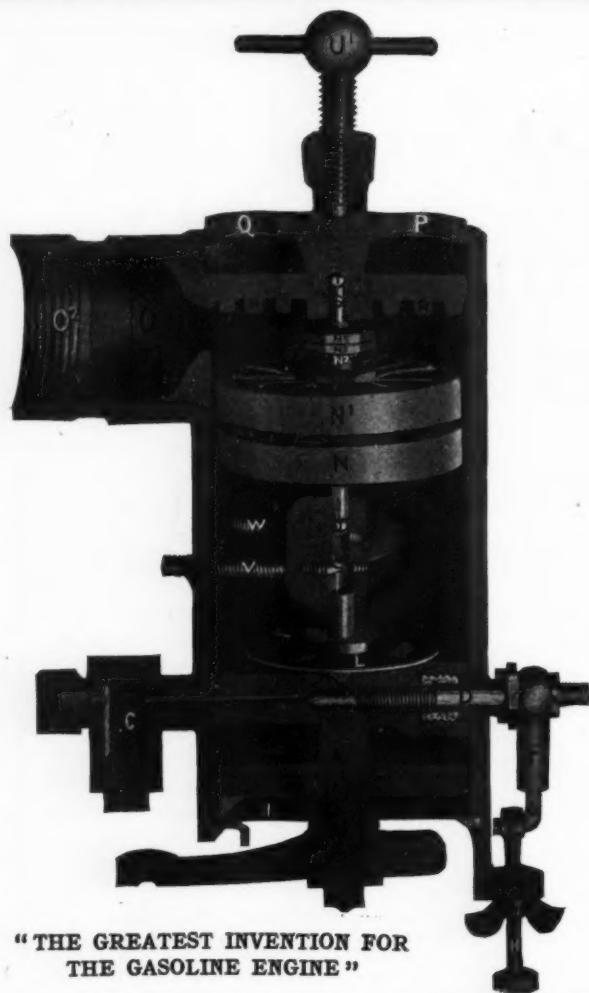
The six-cylinder, seven-passenger Type H is the ablest and easiest touring-car in existence, yet it weighs only 2,600 pounds—a thousand pounds less than the average seven-passenger automobile.

Doesn't the air-cooling question answer itself?

Write for the catalogue of Franklin models

H. H. FRANKLIN MFG. CO., Syracuse, N. Y.

Member Association Licensed Automobile Manufacturers



"THE GREATEST INVENTION FOR
THE GASOLINE ENGINE"

Remember, We Guarantee for

"THE SCIENTIFIC CARBURETER"

25 Per Cent. More Everything

(Power, Speed, Economy, Flexibility, etc.)

30 DAYS' FREE TRIAL

(Money back if you want it)

CAPITAL WANTED

THE sales of "THE SCIENTIFIC CARBURETER" having increased so enormously, we find it necessary to enlarge our present manufacturing facilities and hereby offer for sale to the public a few shares of the Guaranteed Preferred Stock of this Company.

Regarding the class of the above-mentioned investment, will say: We can show the investor for his money a dividend-earning power of from 25 to 50 per cent. and a speculative chance of from 100 to 300 per cent. within the year.

THE E. W. STEVENS COMPANY, Inc.

EAST NEW MARKET, MD.

AN UNUSUAL PROPOSITION

ARE YOU AUTOMOBILE DEALERS MAKING MONEY?

If not, **WHY NOT?** Is it because your apparent profit is wiped out by **AFTER-SALE** contingencies? Is it because your business system is **FAULTY**, your methods **DISORDERLY** and **CARELESS**? Is it because you are located in a district where the line of cars you sell **IS NOT ADAPTED OR IN DEMAND**? Is it because you are a **SKIMMER**, not doing the business seriously, as though you had no **REAL PLACE** in business life? Is it **BECAUSE** you consider the selling of automobiles **A GAME** rather than a business?

The fact that so large a number of retail automobile dealers **ARE NOT MAKING MONEY**, and I am happy to say that there are **FEW MAXWELL DEALERS** among this class, is a matter of **SERIOUS CONCERN** to those in the industry.

Now, **YOU KNOW ME**; you know that **I MUST** have a good deal of experience, that my plan of covering territory has **BEEN SUCCESSFUL**; that **I KNOW** the business end of the automobile business; **THAT MY PLANS CARRY**.

Now **I HAVE**, like our friend from Boston, **A REMEDY**. Ha, ha, you say to yourself, pretty cute. He means to

tell us to sell Maxwell Cars. **YES**, that's part of it, **BUT NOT** the only part. **I HAVE DEEPER REASONS**.

To accomplish, **I WANT FIRST** to get into communication with you, to become better acquainted. **LET ME SEND** you **The Co-Operator**, our own automobile paper, **FREE** for three months. I will **LEAD UP** to my plan in it. It will be a valuable educator, and in due course I will **GIVE YOU** the complete details of **MY REMEDY**.

Of course, **The Co-Operator** says a **GOOD DEAL** about Maxwell Cars, but it **HAS ANOTHER MISSION TO YOU**. It will lead to a better understanding between us, so that later **I CAN MAKE YOU A LOT OF MONEY**.

Apropos of Maxwell dealers making money, **IT IS BECAUSE** Maxwell Cars, while not yet absolutely perfect, **ARE THE NEAREST** perfect, and because of their correct mechanical principles; **UNIT CONSTRUCTION**; **THREE-POINT SUSPENSION**; **NATURAL WATER COOLING**; **MULTIPLE-DISC CLUTCH**; **METAL BODIES**; and **ALL THE OTHER** distinctive Maxwell features **PRODUCE SATISFIED USERS**, and every user **BECOMES** a salesman and a booster. **WILL YOU PLEASE** cut out the blank below and send in **AT ONCE**? **LET US BEGIN THE GOOD WORK NOW**.

Benj. Briscoe President,

Maxwell - Briscoe Motor Company

Members *A. M. C. M. A.*

FACTORIES:
TARRYTOWN, N. Y. PAWTUCKET, R. I.
NEWCASTLE, IND.

P. O. Box 107
TARRYTOWN, N. Y.

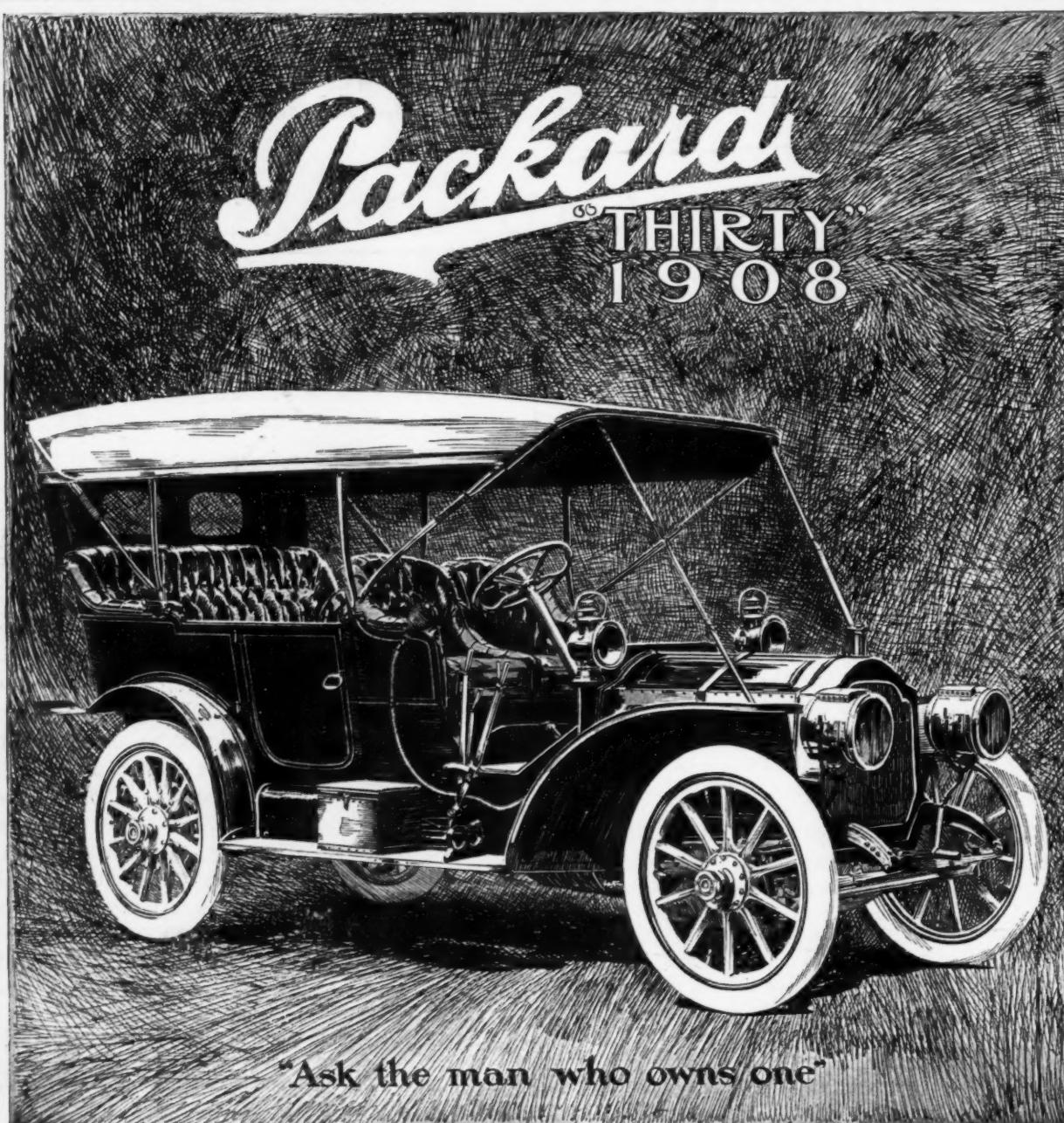
MAXWELL-BRISCOE MOTOR COMPANY, Co-Operator Department, Tarrytown, N. Y.

GENTLEMEN:—Enter my name on free dealers' mailing list of **The Co-Operator**.

Name of Dealer.....

Address.....

Notice.—This in no way carries with it the slightest obligation, but I do it simply because Briscoe asks it and I want to be a good fellow.



PACKARD MOTOR CAR COMPANY
DETROIT, MICHIGAN

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OHIO STATE UNIVERSITY